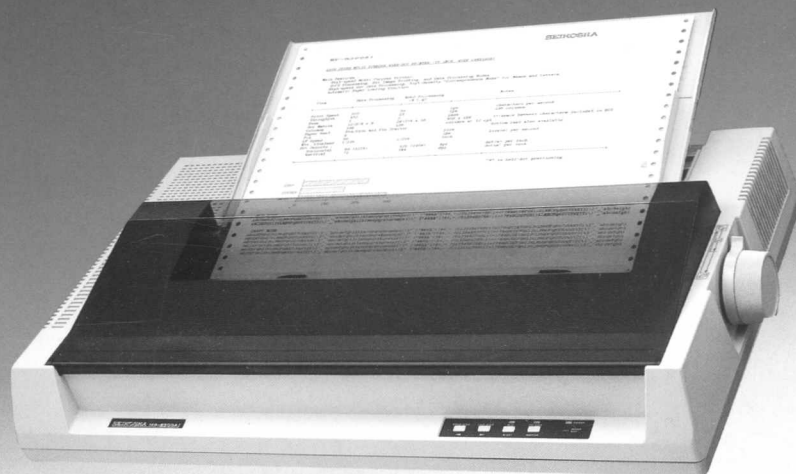


**MP** **MP-5300AI**  
**MP-1300AI**

**OWNER'S MANUAL**  
**MATRIX PRINTER**



**SEIKOSHA**

**WARNING:**

"This equipment has been certified to comply with the limits for a Class B computing device, pursuant to Subpart J of Part 15 of FCC Rules. Only computers certified to comply with the Class B limits may be attached to this printer. Operation with noncertified computers is likely to result in interference to radio and TV reception."

"This equipment generates and uses radio frequency and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna
- Relocate the computer with respect to the receiver
- Move the computer away from the receiver
- Plug the computer into a different outlet so that computer and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful:

"How to Identify and Resolve Radio-TV Interference Problems",

This booklet is available from the U.S. Government Printing Office, Washington, D.C. 20402, Stock No. 004-000-00345-4.

"It is necessary to use shielded interconnect cables to insure compliance with FCC Class B limits for radio frequency emissions".

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**SEIKOSHA CO.,LTD.**  
**SYSTEM EQUIPMENT DIVISION**  
4-1-1 TAIHEI SUMIDA-KU TOKYO 130, JAPAN.

94100-6120-4

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## **MAIN FEATURES**

This printer provides the following features:

- Paper-out detection
- Automatic paper loading
- Automatic paper ejection
- Left and right margin settings (via switches or commands)
- A variety of character fonts are possible including Near Letter Quality (NLQ), Proportional, and Graphic printing
- Form feed function, provided by a switch or command
- Self-Test printing
- Automatic printing
- Double-Width Character mode
- Bold Character mode
- Double-Strike Character mode
- Italic Character mode
- Superscript/Subscript Character mode
- Buzzer function
- Internal RAM error detection
- Input data hexadecimal dump
- Download character function (User-defined character)  
A maximum of 256 download characters in Draft mode
- Standard mode/IBM mode, selected by using a DIP switch
- Serial and parallel interfaces are standard
- Fan-fold paper inserted from the rear or bottom
- Print head protection against high temperature
- Optional Automatic Cut Sheet Feeder

### **MP-1300:**

- 10K-byte communication buffer  
(7K-byte communication buffer when using download character)  
Additional 8K or 16K optional  
Consult your dealer to add an optional 8K-byte or 16K-byte RAM.
- Optional 7-color printing function (MP Color Kit 10)  
Easy-to-handle.PIC (Plug-in Cartridge)

### **MP-5300:**

- 6K-byte communication buffer  
(3K-byte communication buffer when using download character)  
Additional 8K or 16K optional  
Consult your dealer to add an optional 8K-byte or 16K-byte RAM.

# **SPECIFICATIONS**

## **Printing Specifications**

1. Printing Method  
Impact Dot Matrix  
Bidirectional Logic Seeking Printing

2. Print Head  
9 Pins

3. Number of Characters  
185 Characters and Symbols  
49 International Characters

4. Graphic Printing  
8 Categories, vertical 8 dots

### MP-1300:

- 480 dots graphic : Note 1
- 576 dots graphic
- 640 dots graphic
- 720 dots graphic
- 960 dots graphic : Note 1
- 960 dots graphic : Note 2
- 1920 dots graphic : Note 2
- 1152 dots graphic

### MP-5300:

- 816 dots graphic : Note 1
- 979 dots graphic
- 1088 dots graphic
- 1224 dots graphic
- 1632 dots graphic : Note 1
- 1632 dots graphic : Note 2
- 3264 dots graphic : Note 2
- 1958 dots graphic

Note 1: Vertical 9 dots printing is also possible.

Note 2: When the leading dot is printed, the following horizontal dot cannot be printed.

5. Print Mode

### Draft Mode:

Pica	10 CPI
Elite	12 CPI
Condensed	17 CPI
Condensed Elite	20 CPI

### Near Letter Quality:

Pica	10 CPI
Elite	12 CPI

8 categories of graphic printing



Mixing any of the above modes within a single line is possible. In addition, this printer is capable of Bold, Double-Width, Double-Strike, Superscript/Subscript, Proportional, and Italic Character modes.

#### 6. Paper Feed Method, Paper Width, and Paper Weight

Friction method: Cut sheet (A4, B5, letter, legal)  
 45 kg – 70 kg in Japan  
 14 lbs. – 21 lbs. in USA  
 53 g/m<sup>2</sup> – 81 g/m<sup>2</sup> in Europe

Tractor method: Fan-fold paper (4" ~ 10")  
 45 kg – 70 kg in Japan  
 14 lbs. – 21 lbs. in USA  
 53 g/m<sup>2</sup> – 81 g/m<sup>2</sup> in Europe

#### 7. Multiple Copies

Non-carbon paper, 40 g/m<sup>2</sup>

[ Draft mode .....	Original plus 2 copies	
[ NLQ mode .....	Original plus 4 copies	
		Total thickness:
[ Rear feed .....	Original plus 2 copies .....	0.2mm or less
[ Bottom feed .....	Original plus 4 copies .....	0.3mm or less

#### 8. Ribbon

- Black ribbon
- MP-1300 4-color ribbon: The optional color unit is necessary.

Model	Color Unit
MP-1300	MP-1300
MP-1300	MP-1300

#### 9. Throughput

- MP-1300: 147 lines/minute in Draft Pica mode
- MP-5300: 103 lines/minute in Draft Pica mode

#### 10. Line Feed Pitch

Minimum of 1/216"

#### 11. Line Feed Speed

30 lines/second

## SPECIFICATIONS

### Other Specifications

1. Power Supply 120 VAC : For USA and Canada  
220-240 VAC : For Europe
2. Temperature 5°C – 35°C (during operation)
3. Humidity 20% – 80% (during operation)
4. External Dimensions
  - MP-1300: 470(Width) × 137(Height) × 360(Depth) mm
  - MP-5300: 590(Width) × 137(Height) × 372(Depth) mm
5. Weight Approximately 8.5 kg (MP-1300), 8 kg (MP-5300)
6. Power Consumption
  - MP-1300:  
85 watts (Self test in Draft mode)  
24 watts (Stand-by)
  - MP-5300:  
60 watts (Self test in Draft mode)  
14 watts (Stand-by)

### Options (MP-1300 only)

The following optional devices are available to extend the capability of the printer.

CAT #	Name
# MP-13005	MP Color Kit 10
# MP-13009	MP-CSF 10

With the color unit installed, 7 colors (Red, Yellow, Purple, Blue, Orange, Green, and Black) can be specified in any of the following 3 ways:

1. Character units or graphic column units
2. Single dot units scanning horizontally corresponding to RGB.
3. Single dot units scanning horizontally corresponding to the colors of the ribbon cassette.

## PRINTER DESCRIPTION

### Unpacking the Printer

Be sure to locate the following items that came with the printer in the box.

1. Printer
2. Ribbon Cassette (Black)
3. Tractor Unit
4. Printer Cover
5. Paper Rack
6. Paper Rack Support
7. Power Cord
8. Owner's Manual

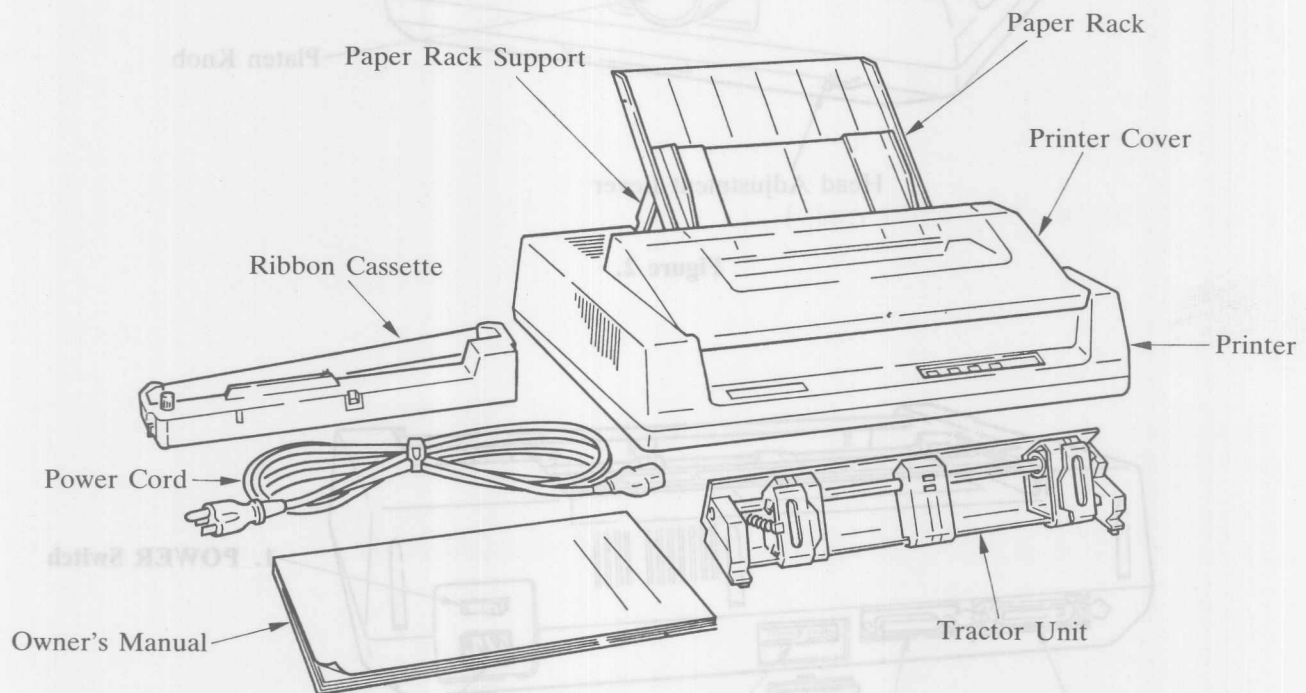


Figure 1.

## Operator Controls and Indicators

It is important to become familiar with the printer before setting it up and using it.

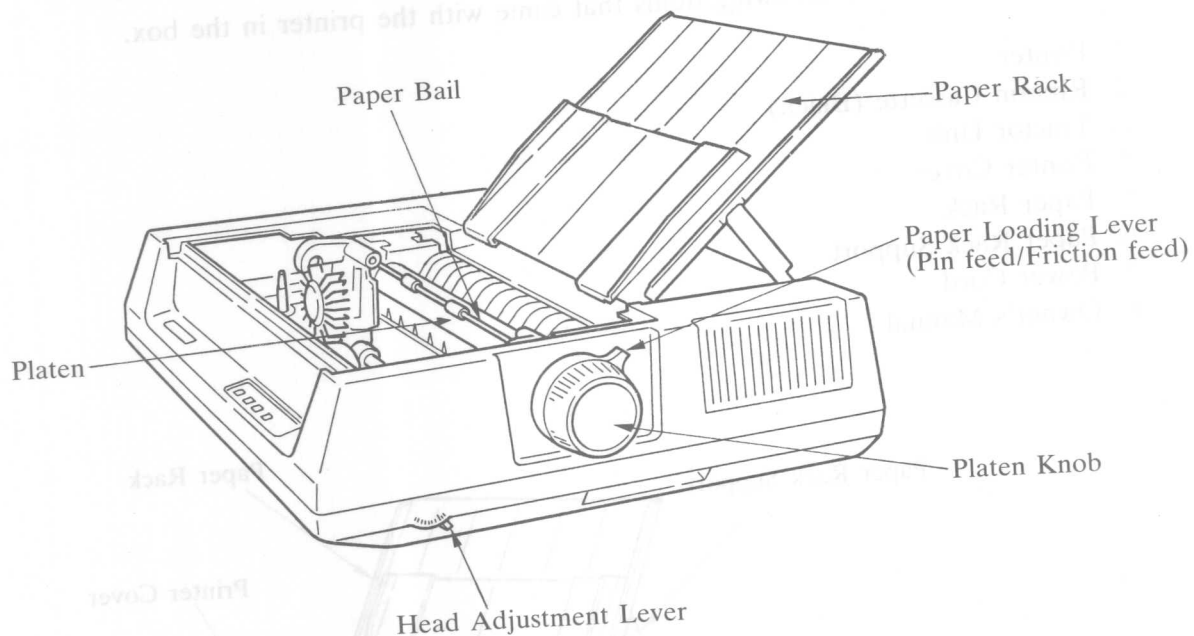


Figure 2.

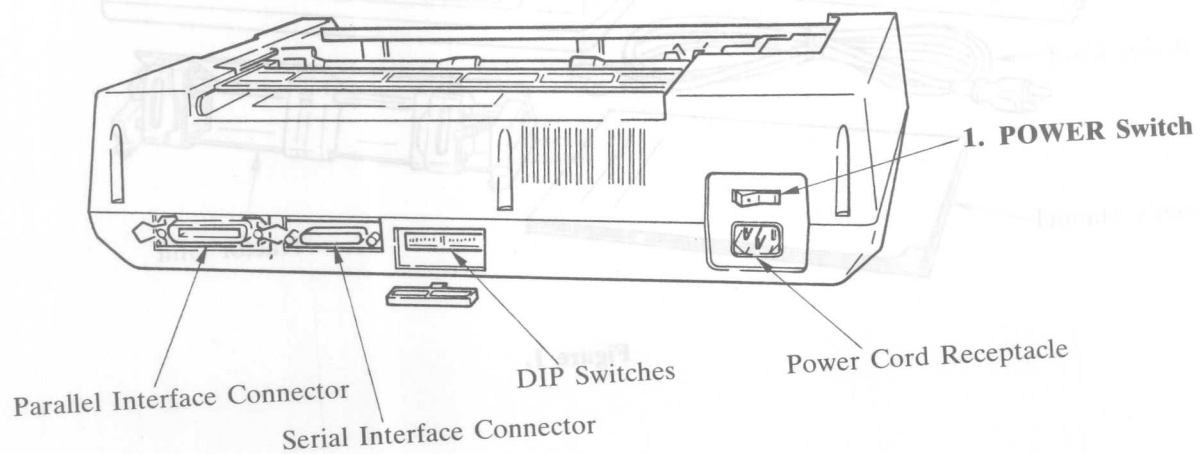


Figure 3.

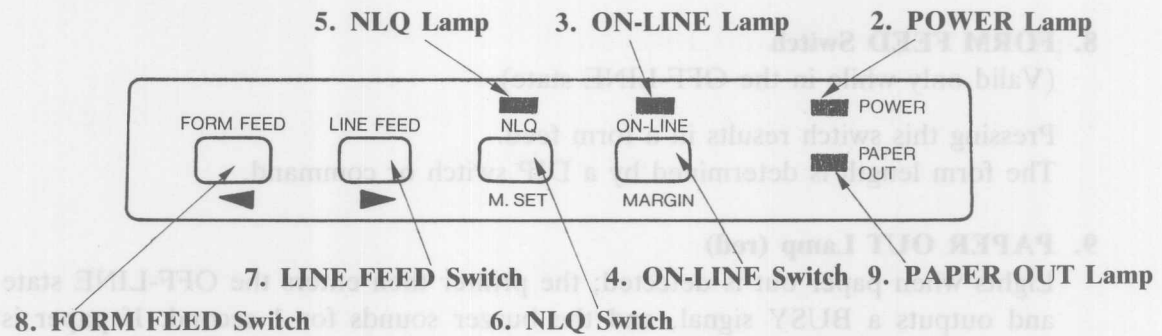


Figure 4.

**1. POWER Switch**

Switches a.c. power on and off.

**2. POWER Lamp (green)**

Remains on while the power is on.

**3. ON-LINE Lamp (green)**

When the lamp is lit, it indicates that the printer is ready to receive data from the computer (ON-LINE state). When it is not lit, the printer cannot receive data (OFF-LINE state). If in the margin set mode, it blinks every 0.3 seconds.

**4. ON-LINE Switch**

Pressing this switch will turn the ON-LINE lamp on or off. In the OFF-LINE state, a BUSY signal to the parallel or serial interface is output. The print head moves to the home position when the printer goes from the OFF-LINE state to the ON-LINE state.

**5. NLQ Lamp (green)**

Goes on when the Near Letter Quality (NLQ) mode is selected. Is off in the Draft mode.

**6. NLQ Switch (Near Letter Quality)**

(Valid only while in the OFF-LINE state)

This switch selects the NLQ or Draft mode.

Pressing this switch puts the printer into the opposite mode.

If the NLQ mode is selected, the lamp is on.

If the Draft mode is selected, the lamp is off.

**7. LINE FEED Switch**

(Valid only while in the OFF-LINE state)

Each time this switch is pressed, a 1/6-inch line feed is performed. If held down, continuous line feeds are performed.

### 8. FORM FEED Switch

(Valid only while in the OFF-LINE state)

Pressing this switch results in a form feed.

The form length is determined by a DIP switch or command.

### 9. PAPER OUT Lamp (red)

Lights when paper out is detected; the printer then enters the OFF-LINE state and outputs a BUSY signal, and the buzzer sounds for 1 second. If paper is inserted and the ON-LINE switch is pressed, this state is terminated.

While in the error state, the lamp blinks.

## Paper Loading Lever for Automatic Paper Loading

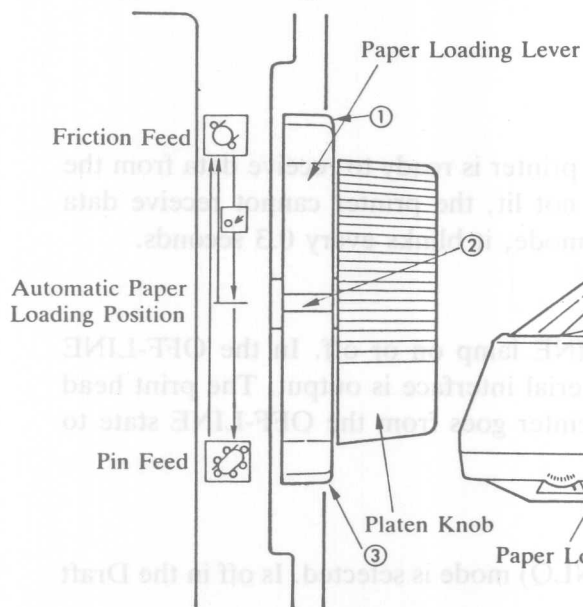


Figure 5.

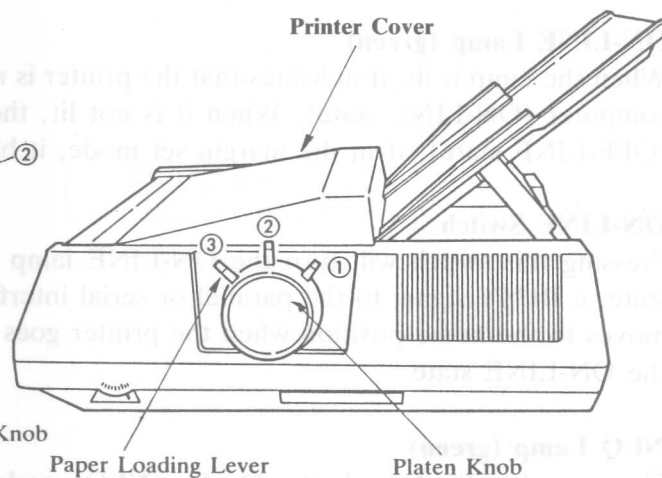


Figure 6.

Position ①: The lever is turned to this position for friction feeding (Cut Sheets).

Position ②: When a cut sheet is placed in the paper rack and the printer cover is closed, the sheet is automatically loaded by moving the lever from position ① to ② and then back to ①. This is called Automatic Paper Loading.

Position ③: The lever is turned to this position for pin feeding (Continuous Forms). After setting continuous forms to the tractor, the paper bail **MUST** be manually moved toward the platen.

The friction rollers located below the platen are pressed against the platen when the paper loading lever is set at position ① or ②.

The friction rollers are released when the lever is at position ③.

## SETTING UP

### Using Continuous Forms (Rear Feed)

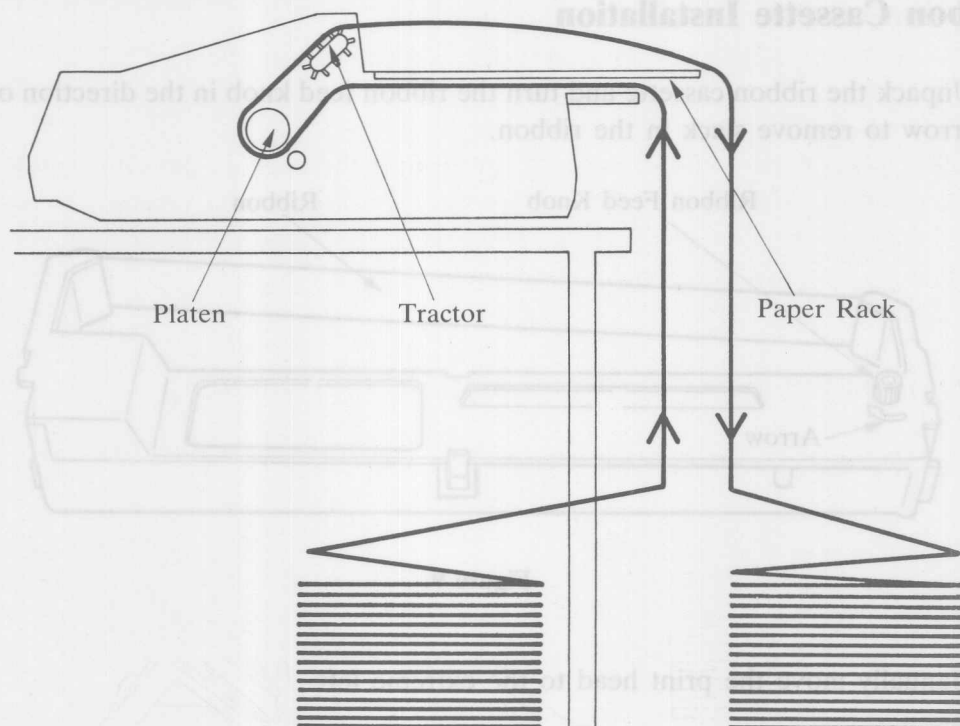


Figure 7.

1. Do not plug the printer in yet.
2. Turn the paper rack support towards the back of the printer to flatten it out.

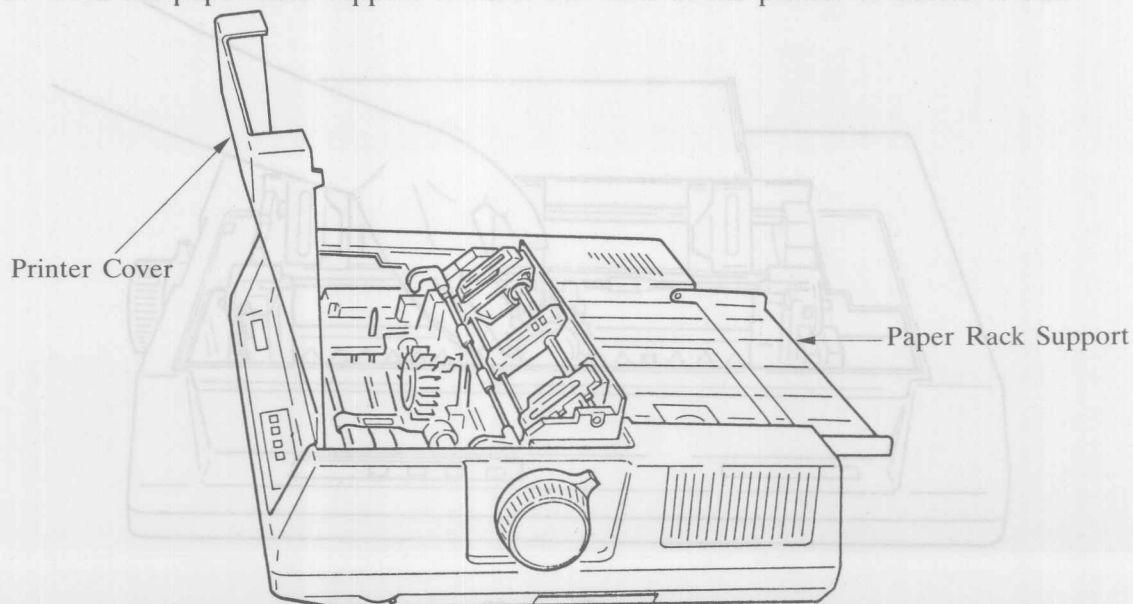


Figure 8.

3. Remove the printer cover by pulling it forward and then upward.

## Ribbon Cassette Installation

4. Unpack the ribbon cassette and turn the ribbon feed knob in the direction of the arrow to remove slack in the ribbon.

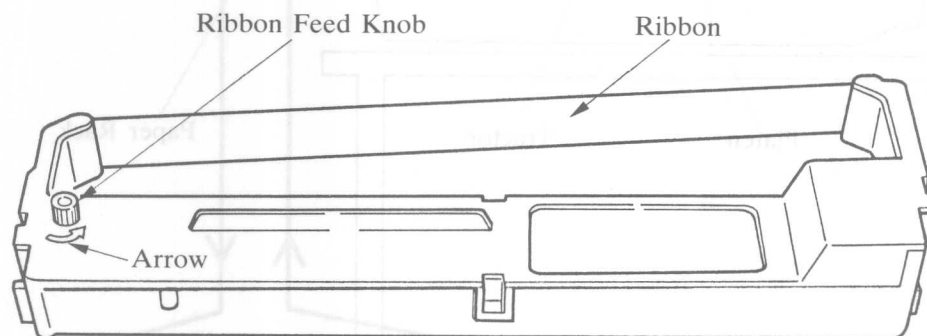


Figure 9.

5. Manually move the print head to the extreme left.

**Note:** It is easier to insert the ribbon when the print head is at the home position (extreme left).

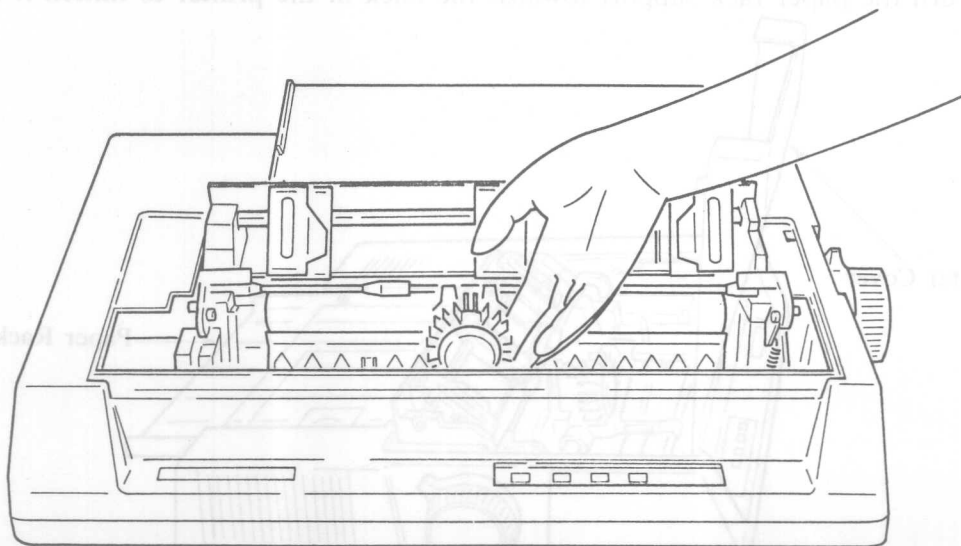


Figure 10.



6. Insert the ribbon between the ribbon guide and the print head, and position the cassette so that the ribbon feed shaft in the printer is inserted into the hole under the ribbon feed knob.

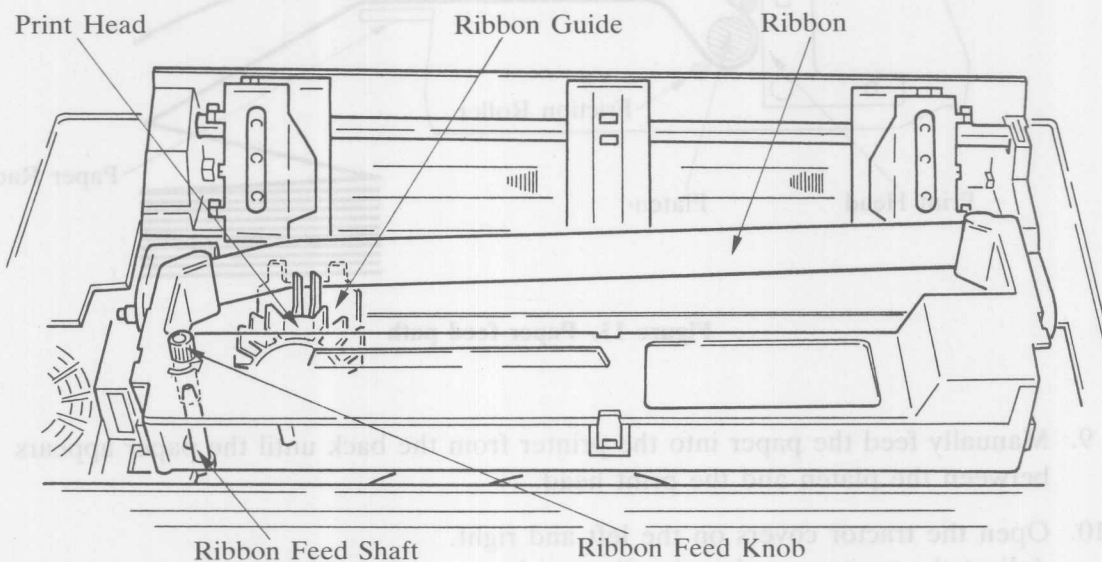


Figure 11.

7. Press gently on the cassette until you feel it snaps into place.  
Twist the ribbon feed knob to tighten the ribbon.
8. Pull the paper loading lever to move the paper bail toward the front.

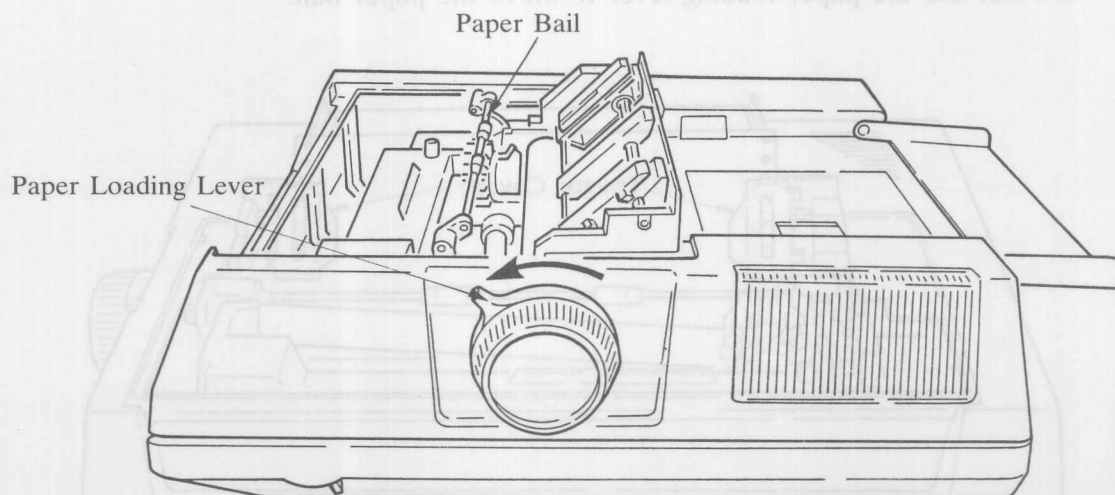
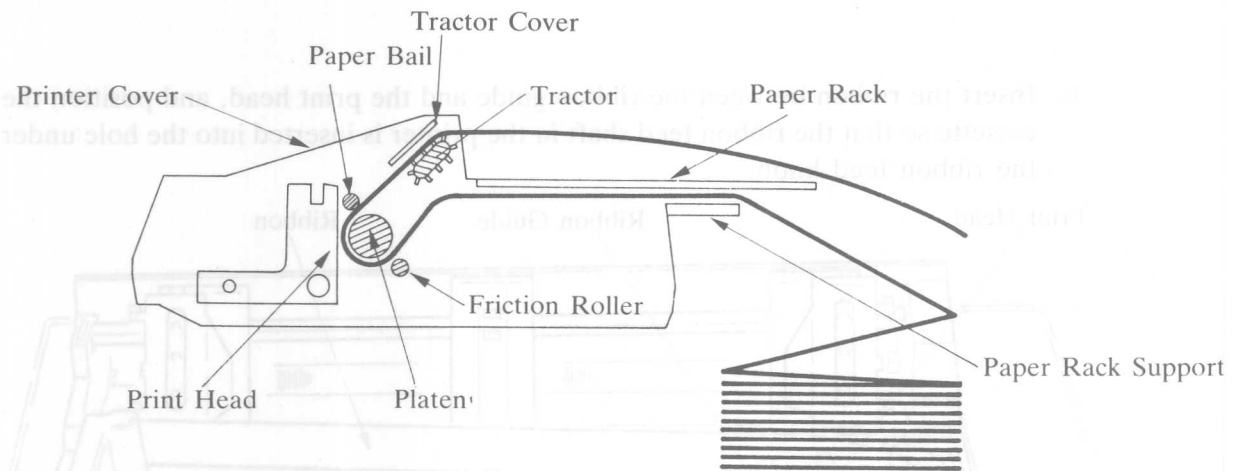


Figure 12.

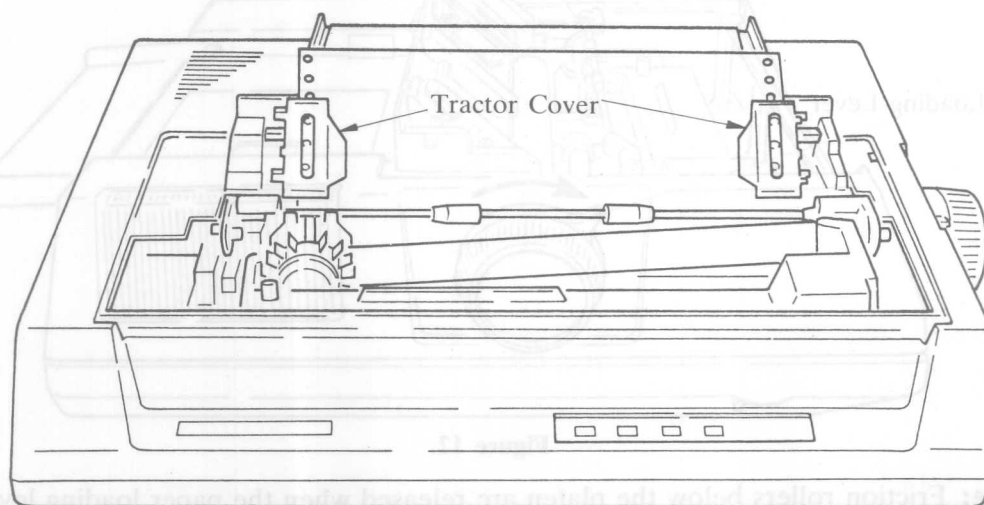
**Note:** Friction rollers below the platen are released when the paper loading lever is at this position.  
Failure to release the friction rollers may cause a paper jam.

## SETTING UP



**Figure 13. Paper feed path**

9. Manually feed the paper into the printer from the back until the paper appears between the platen and the print head.
10. Open the tractor covers on the left and right.  
Adjust the tractors so that the distance between them matches the holes in the paper.
11. When the holes along both sides of the paper are matched up with the tractor paper feed pins, close the tractor covers.
12. With your hand, push the paper bail toward the platen.  
Do not use the paper loading lever to move the paper bail.



**Figure 14.**

13. Hold the paper rack upright and place it on the two supporters located behind the tractor.

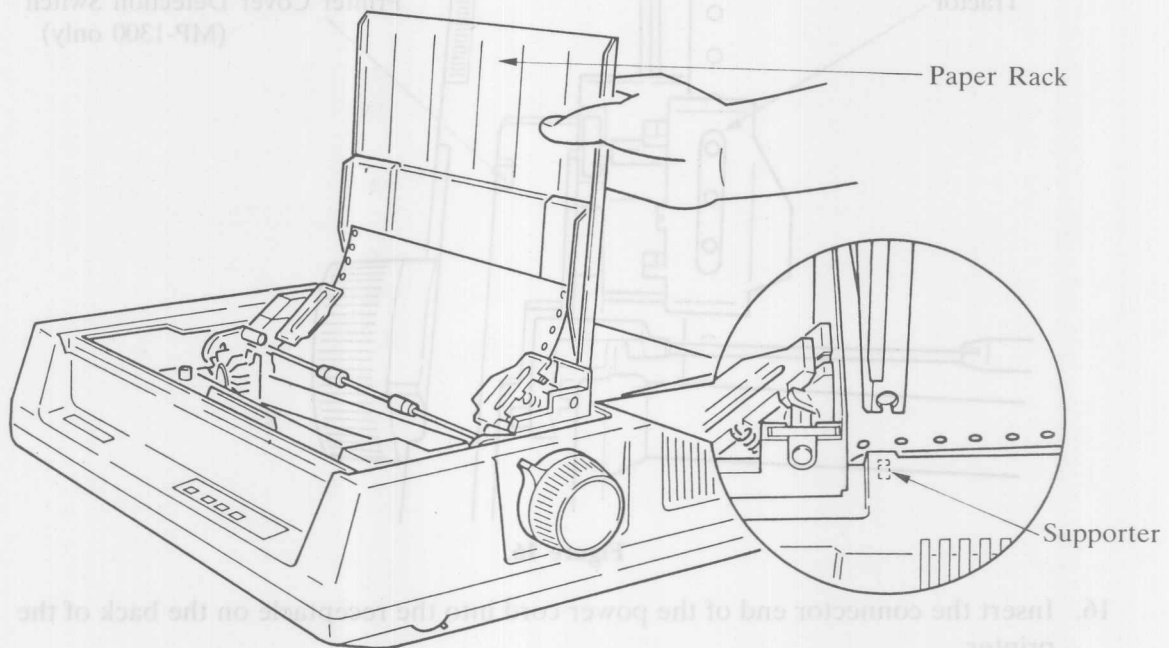


Figure 15.

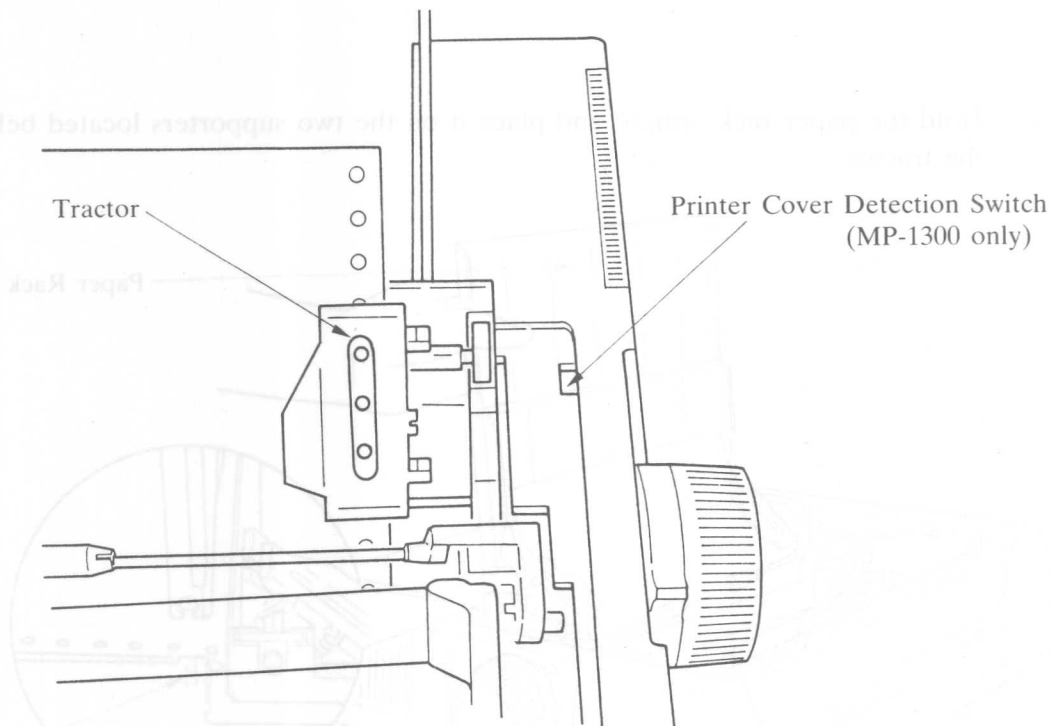
14. Lay down the paper rack.
15. Replace the printer cover.

**Note:** The MP-1300 printer cover **MUST** be closed to enable printing because the printer cover detection switch located at the right of the tractor unit is turned on when closed.



Figure 17.

## SETTING UP

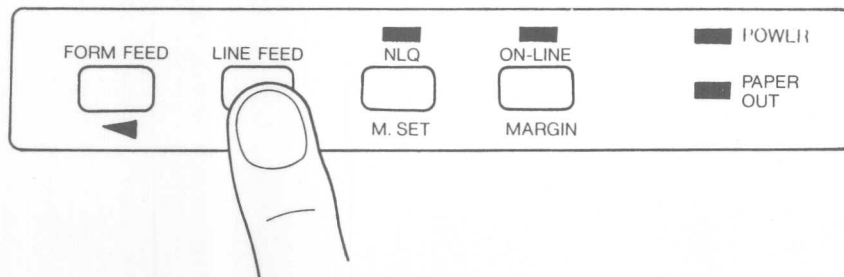


**Figure 16.**

16. Insert the connector end of the power cord into the receptacle on the back of the printer.  
Plug the three-pronged plug end into a grounded three-pronged-wall outlet.

**Caution:** The printer **MUST** be grounded at all times. Never use a 3-to-2 prong conversion plug.

17. Perform self test printing to make sure the printer is working properly.  
To initiate self test printing, hold down the **LINE FEED** switch while turning the power switch on. The **LINE FEED** switch can be released after self test printing starts.



**Figure 17.**

The printer can now be connected to the computer.  
Refer to "Connecting the Printer to a Computer."

## Using Cut Sheets

1. Make sure the power is turned off.
2. Remove the printer cover.
3. Remove the tractor unit by holding both ends of the tractor and pulling it toward the front to unhook its rear hooks.

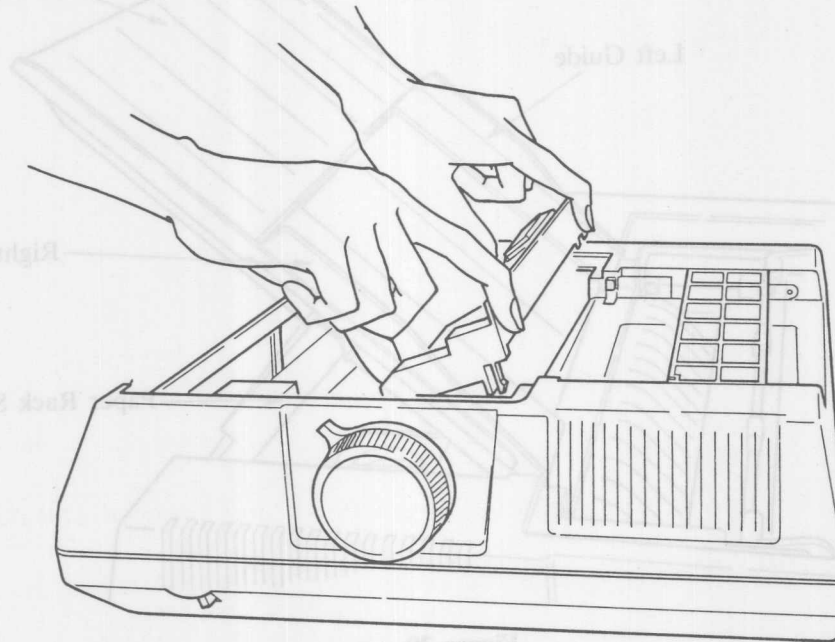


Figure 18.

3. Turn the paper loading lever towards the back, as shown below.

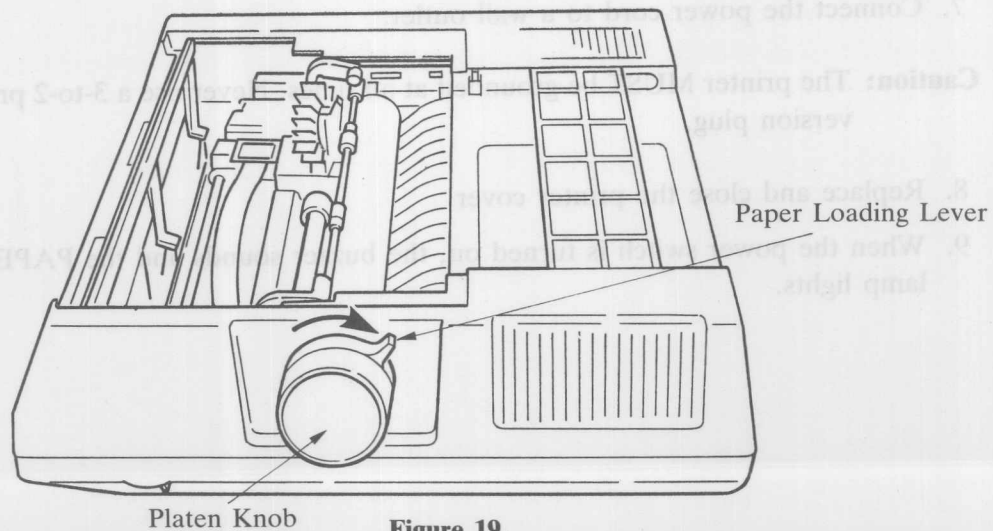


Figure 19.

## SETTING UP

4. To install the ribbon cassette in the printer, repeat steps 4, 5, 6, and 7 of 'Using Continuous Forms' on page 10.
5. Position the paper rack in place so that the paper rack support acts as a prop, as shown in the figure below.

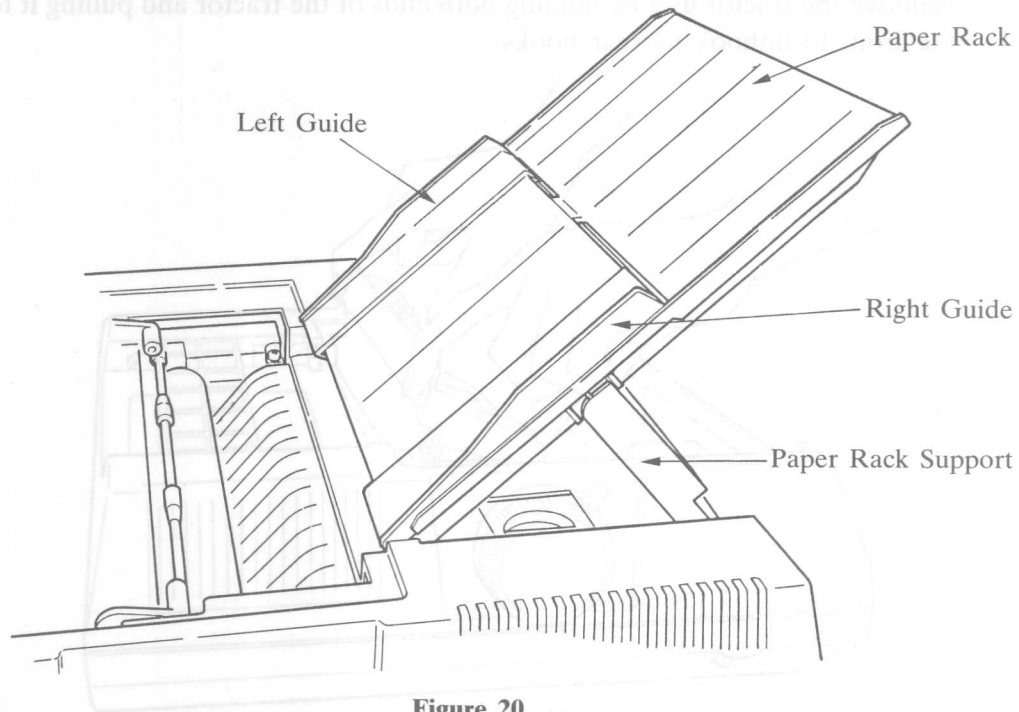


Figure 20.

6. Position the cut sheet at the extreme left of the paper rack. Slide the right guide to the left to match the paper width.
7. Connect the power cord to a wall outlet.

**Caution:** The printer **MUST** be grounded at all times. Never use a 3-to-2 prong conversion plug.

8. Replace and close the printer cover.
9. When the power switch is turned on, the buzzer sounds and the PAPER OUT lamp lights.

10. The cut sheet is automatically loaded into the printer if the paper loading lever is turned from position ① to ②.

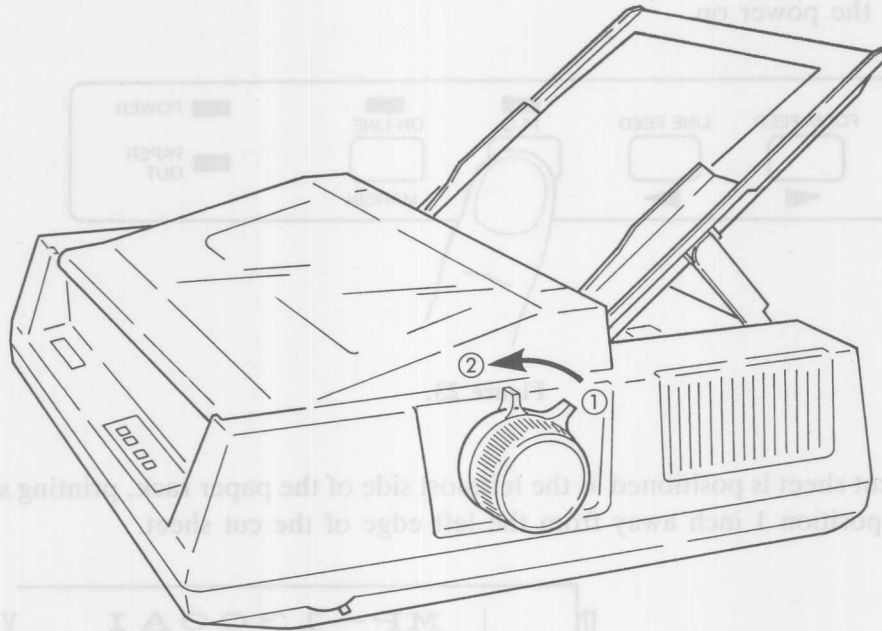
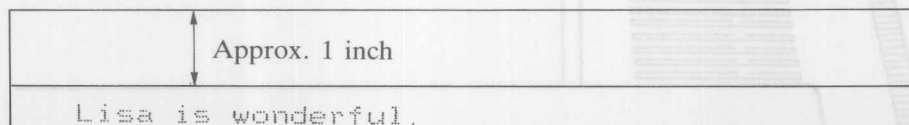


Figure 21.

**Note:** If the PAPER OUT lamp is not lit, automatic paper loading is not performed. In such a case remove the cut sheet and position it again to turn on the lamp.

11. Turn the paper loading lever to position ① so that the paper bail is pressed against the platen.

**Note:** When a cut sheet is loaded by using the paper loading lever, printing starts at a position approximately 1 inch away from the top edge of the cut sheet.



12. Perform self test printing to make sure the printer is working properly.  
To start self test printing in the NLQ mode, hold down the NLQ switch while turning the power on.

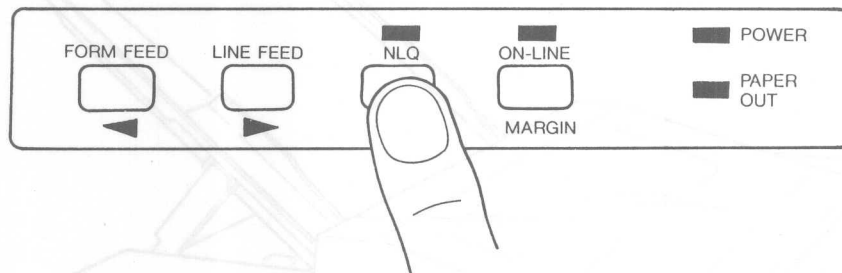


Figure 23.

**Note:** If a cut sheet is positioned at the leftmost side of the paper rack, printing starts at a position 1 inch away from the left edge of the cut sheet.

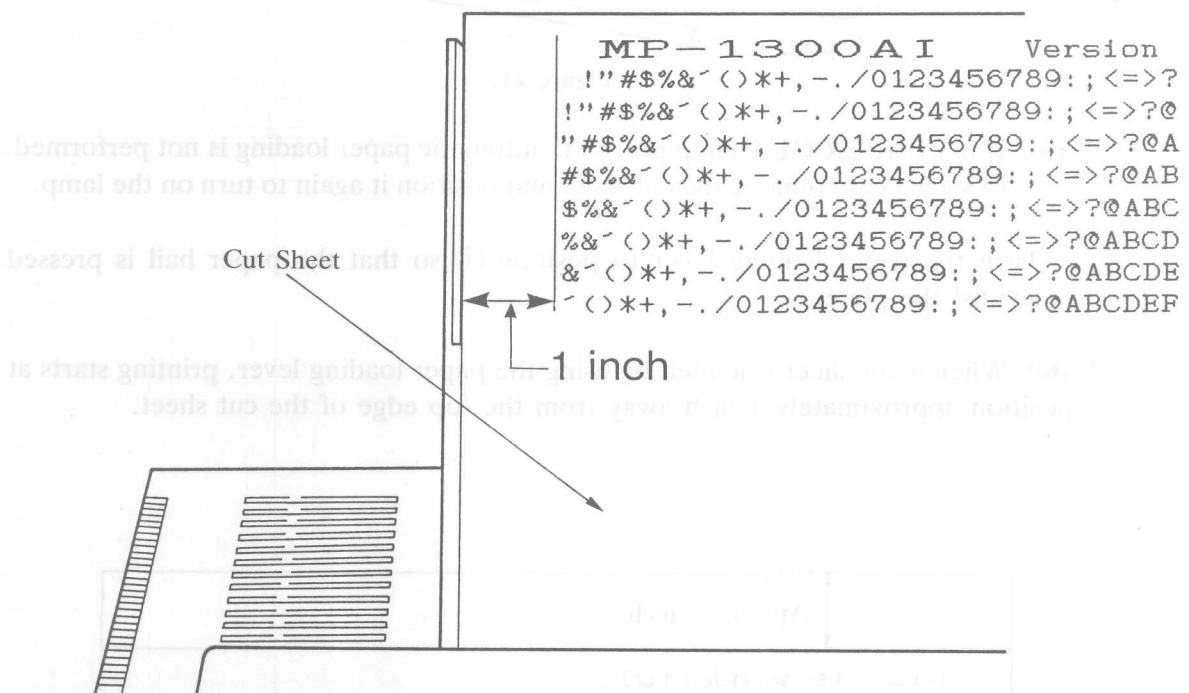


Figure 24.



## Using Continuous Forms (Bottom Feed)

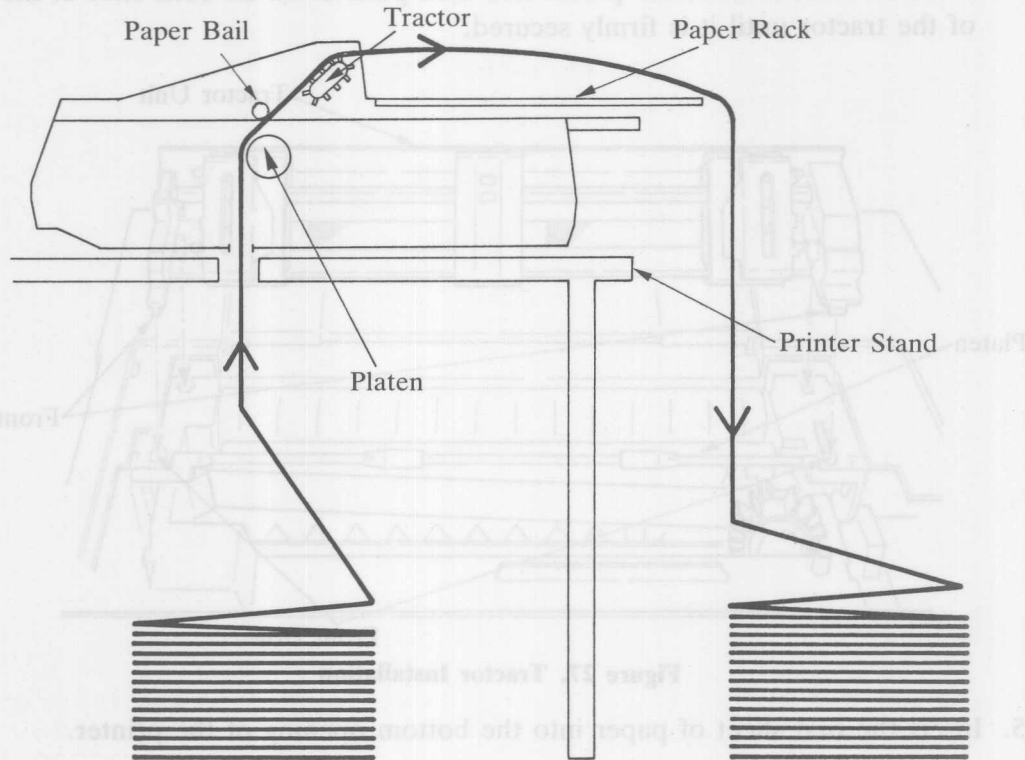


Figure 25.

1. Place the printer on a slotted printer stand, carefully aligning the slot in the stand with the bottom opening of the printer.
2. Install the ribbon cassette.
3. Turn the paper loading lever forward to release the paper bail.

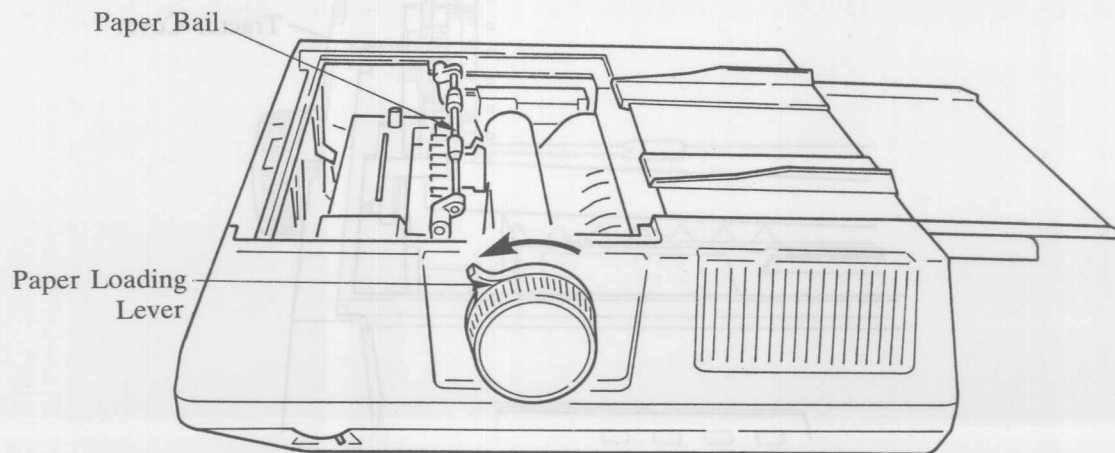
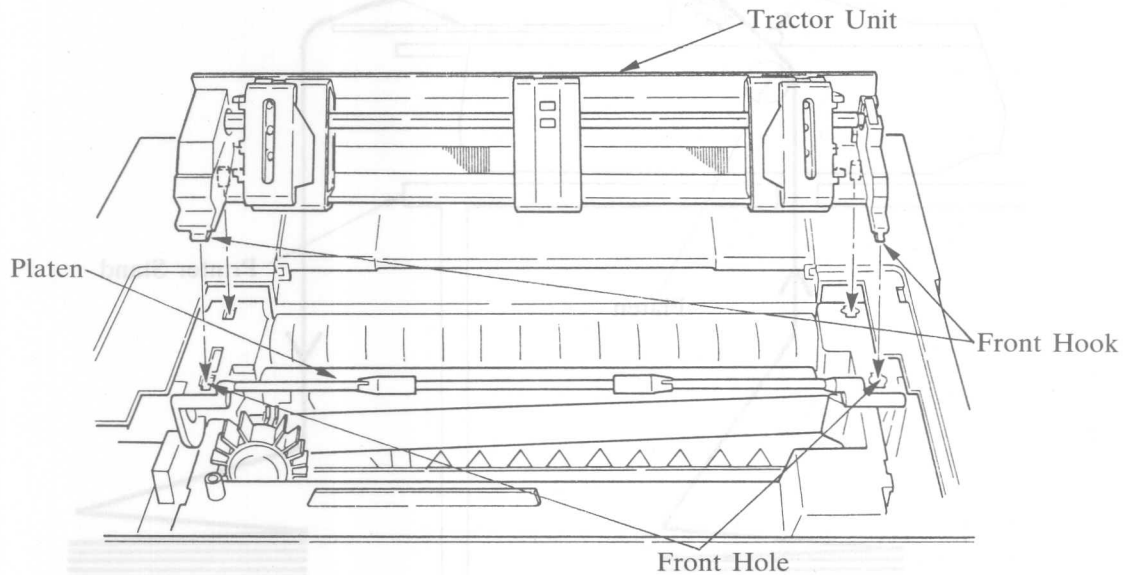


Figure 26.

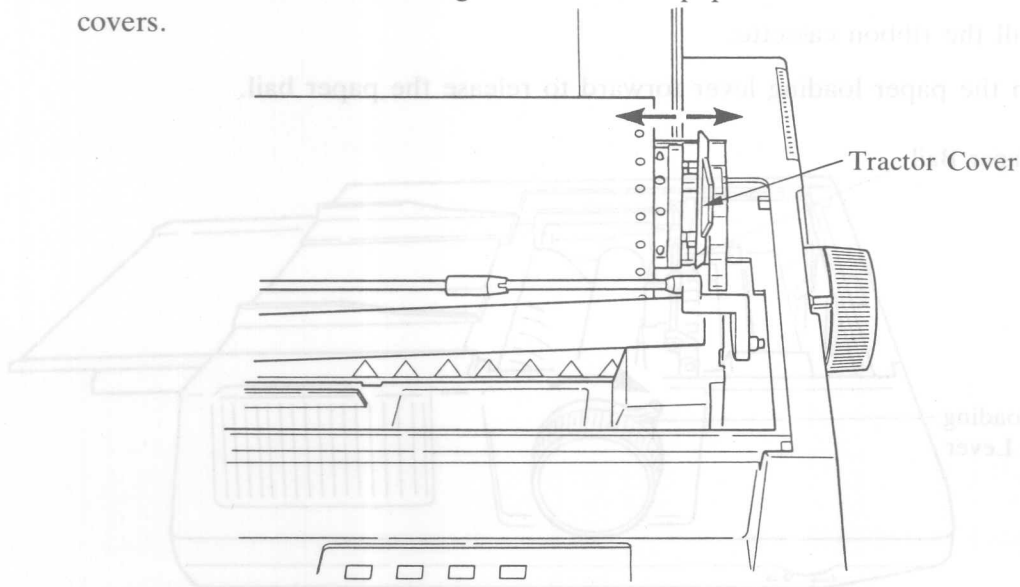
## SETTING UP

4. To install the tractor unit, insert the front hooks of the tractor into the front holes on both sides of the platen and then push down on both ends at the rear of the tractor until it is firmly secured.



**Figure 27. Tractor Installation**

5. Insert the first sheet of paper into the bottom opening of the printer.
6. Slide it up until it appears in front of the platen.
7. Open the tractor covers.
8. Slide the tractors to left or right to match the paper width and close the tractor covers.

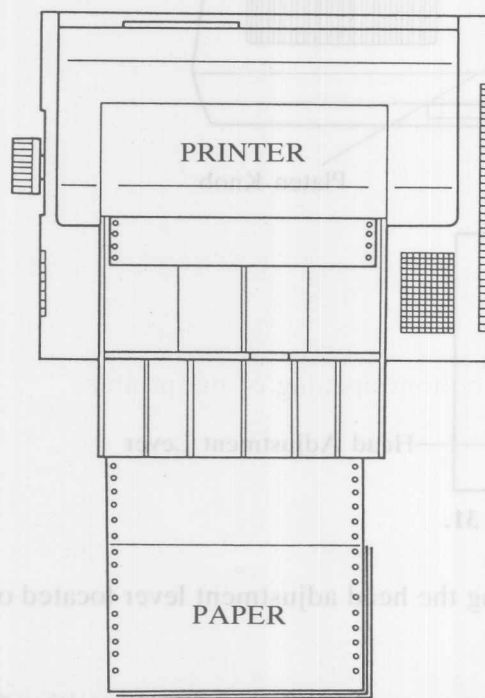


**Figure 28.**

9. Push the paper bail by hand toward the platen.  
Do not use the paper loading lever to move the paper bail.
10. Replace and close the printer cover.
11. Connect the power cord.
12. Perform self test printing to confirm that the printer is operating properly.

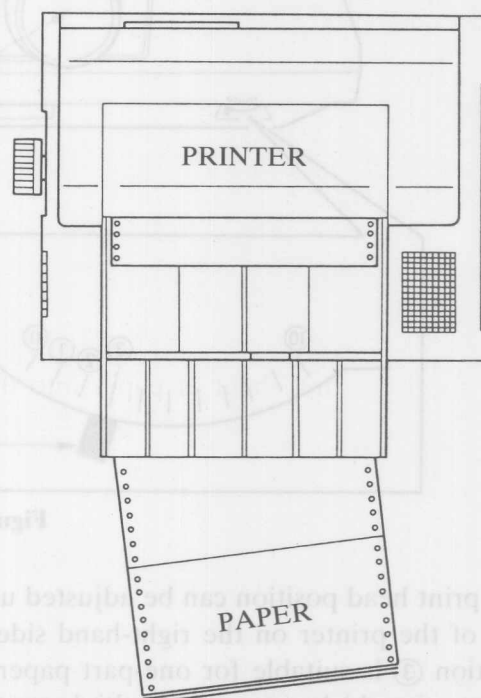
## More About the Printer

### • Paper Position



Correct

**Figure 29.**



Incorrect

**Figure 30.**

It is very important that the paper enters the printer straight; otherwise paper skewing or jamming may occur.

- **Head Adjustment Lever**

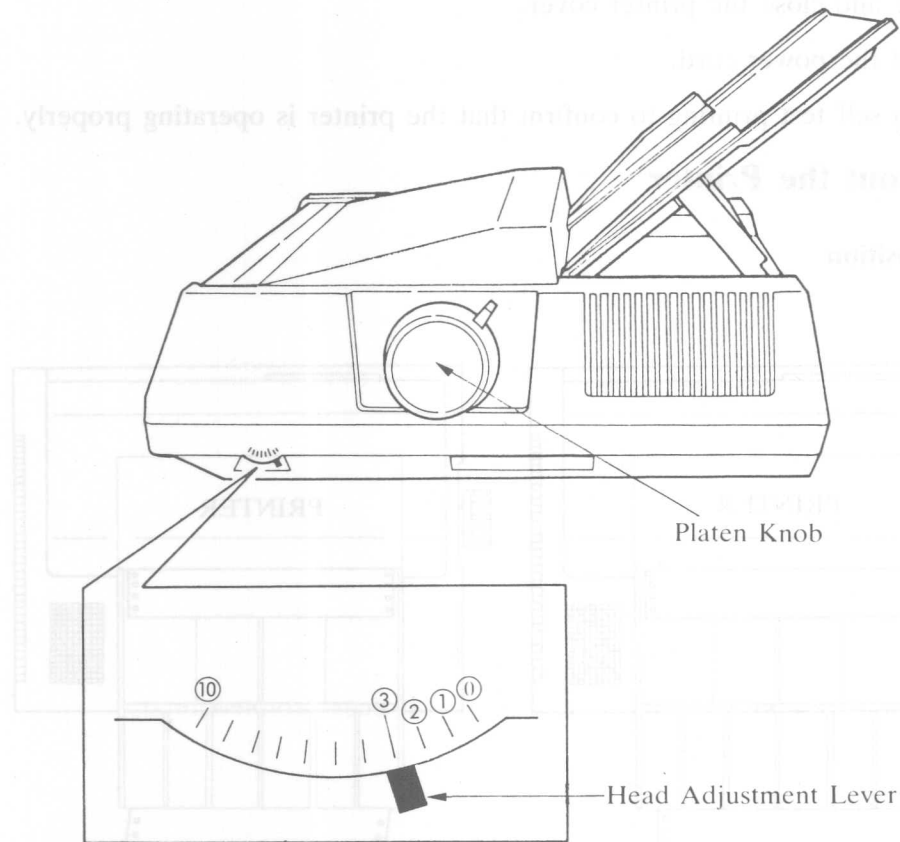


Figure 31.

The print head position can be adjusted using the head adjustment lever located outside of the printer on the right-hand side.

Position ③ is suitable for one-part paper.

When using thicker paper or multiple-part paper, move the lever toward position ⑩.

## Connecting the Printer to a Computer

You should have either a parallel or serial interface cable to connect a computer to the printer. Before connecting them, make sure that they are both turned OFF.

If you are uncertain about what type of interface cable to use, consult the dealer where you purchased the printer.

But, if you are capable of making an interface cable, please refer to the "PARALLEL INTERFACE" chapter on page 149 or the "SERIAL INTERFACE" chapter on page 154.

### • Connecting the Parallel Interface

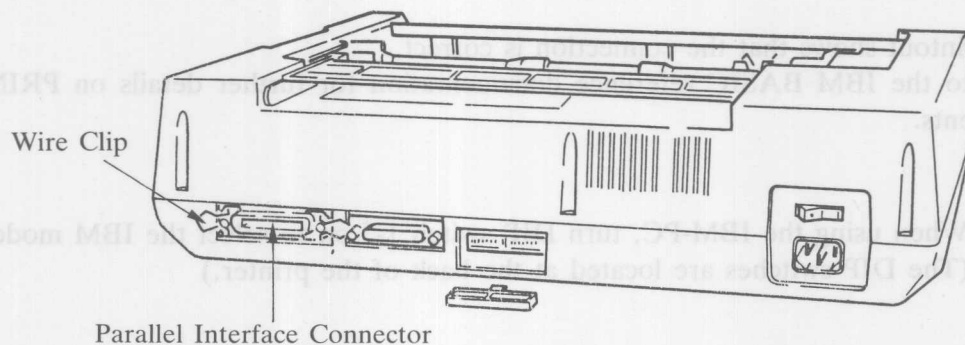


Figure 32.

1. Insert the 36-pin plug into the parallel interface connector on the left back of the printer.
2. Snap the 2 wire clips onto the plug to make a secure connection.
3. Connect the other end of the cable to a computer.
4. Insert the ribbon cassette and the paper into the printer.
5. Turn the printer's power on first then the computer's power.
6. Try the following simple IBM BASIC program to output data to the printer.  
If necessary, change it to suit your computer's language.

```

10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,"Program example for the IBM PC. ";CHR$(10);
40 PRINT #1,"The connection is O.K. ";CHR$(10);
50 END

```

RUN ENTER

## SETTING UP

7. The printout should look like this:

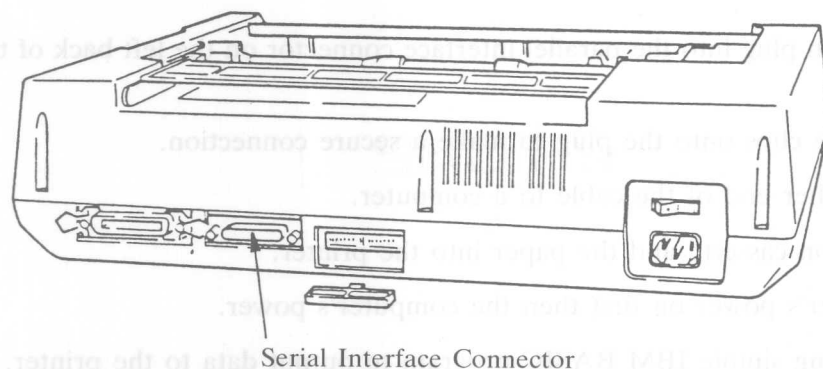
```
Program example for the IBM PC.  
The connection is O.K.
```

This printout shows that the connection is correct.

Refer to the IBM BASIC reference documentation for further details on PRINT statements.

**Note:** When using the IBM-PC, turn DIP switch 1-5 on to select the IBM mode.  
(The DIP switches are located at the back of the printer.)

### •Connecting the Serial Interface



**Figure 33.**

1. Insert the 25-pin plug into the serial interface connector on the back left of the printer.
2. Tighten the two mounting screws on each side of the connector to make a secure connection.
3. Connect the other end of the cable to a computer.
4. Insert the ribbon cassette and the paper into the printer.
5. Turn the printer's power on first then the computer's power.
6. Try the following simple IBM BASIC program to print so as to make sure the connection is correct.

To match the data transfer mode, set the DIP switches located at the back of the printer as follows.

DIP switch	Set to :	Function	Selection
2-2 2-3	ON ON	Data transfer speed	9600 BPS*
2-4 2-5	ON OFF	Serial protocol	READY/BUSY
2-6 2-7	ON OFF	Parity	Non Parity
2-8	OFF	Data length	8 bits

BPS: Bit Per Second

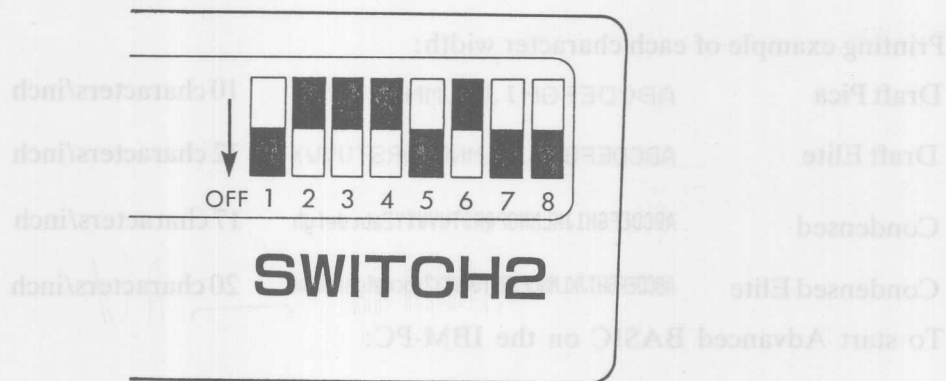


Figure 34.

After setting the DIP switches, turn the power switch off and back on again.

If necessary, change the program to suit your computer's requirements.

```
10 OPEN "COM1:9600,N,8,1" AS#1
20 PRINT #1,"PRINT example for the IBM PC.";CHR$(10);
30 PRINT #1,"The connection must be O.K.";CHR$(10);
40 END
```

RUN

```
PRINT example for the IBM PC.
The connection must be O.K.
```

7. This printout shows that the connection is correct.

Refer to the IBM BASIC reference manual for further details on the OPEN and PRINT statements.

**Note:** When using the IBM-PC, turn on DIP switch 1-5, which is located at the back of the printer, to select the IBM mode.

## **—INTRODUCTION TO PRINTER FEATURES FOR BEGINNERS—**

You can skip this chapter and go straight to the next chapter if you are familiar with printer control programming.

If you are not familiar with features of the printer and/or BASIC programming, read this chapter carefully to learn how to get the most out of the printer.

It is worth actually running the example programs listed in this chapter.

The examples in this chapter are written in the IBM BASIC programming language for the parallel interface. Change them, if necessary, to suit your computer's language.

### **STEP 1. Character Width Selection**

Printing example of each character width:

Draft Pica	ABCDEFGHIJKLMNOPQRST	10 characters/inch
Draft Elite	ABCDEFGHIJKLMNOPQRSTUVWXYZ	12 characters/inch
Condensed	ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefgh	17 characters/inch
Condensed Elite	ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmn	20 characters/inch

To start Advanced BASIC on the IBM-PC:

1. Insert the PC DOS diskette in drive A.
2. Switch on the IBM-PC.
3. Enter the command "BASICA."

Now you can type the program below to print characters of the 4 different widths.

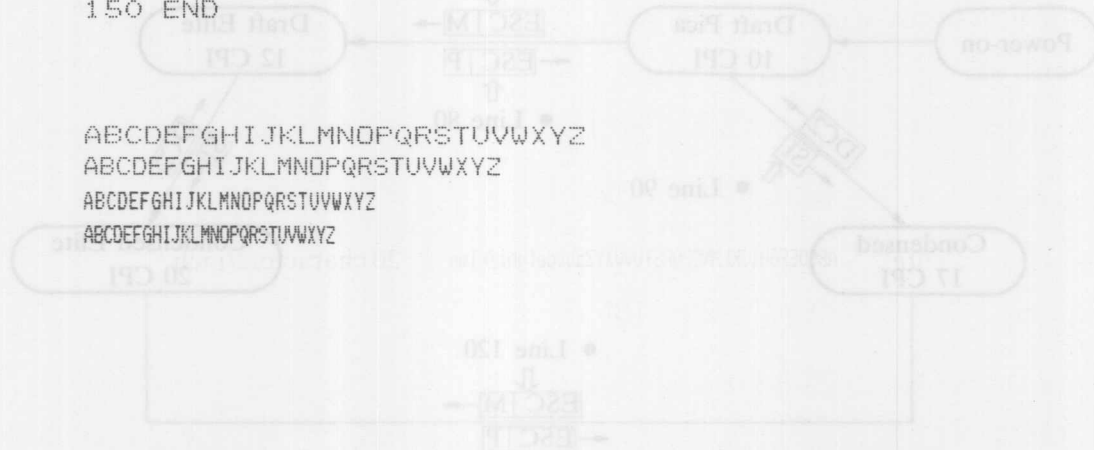


**Program Example:**

```

10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,"ABCDEFGHIJKLMNOPQRSTUVWXYZ"; 'Draft Pica
40 PRINT #1,CHR$(13);CHR$(10);
50 PRINT #1,CHR$(27);"M"; 'Draft Elite
60 PRINT #1,"ABCDEFGHIJKLMNOPQRSTUVWXYZ";
70 PRINT #1,CHR$(13);CHR$(10);
80 PRINT #1,CHR$(27);"P"; 'Return to Draft Pica
90 PRINT #1,CHR$(15); 'Condensed
100 PRINT #1,"ABCDEFGHIJKLMNOPQRSTUVWXYZ";
110 PRINT #1,CHR$(13);CHR$(10);
120 PRINT #1,CHR$(27);"M"; 'Condensed Elite
130 PRINT #1,"ABCDEFGHIJKLMNOPQRSTUVWXYZ";
140 PRINT #1,CHR$(13);CHR$(10);
150 END

```

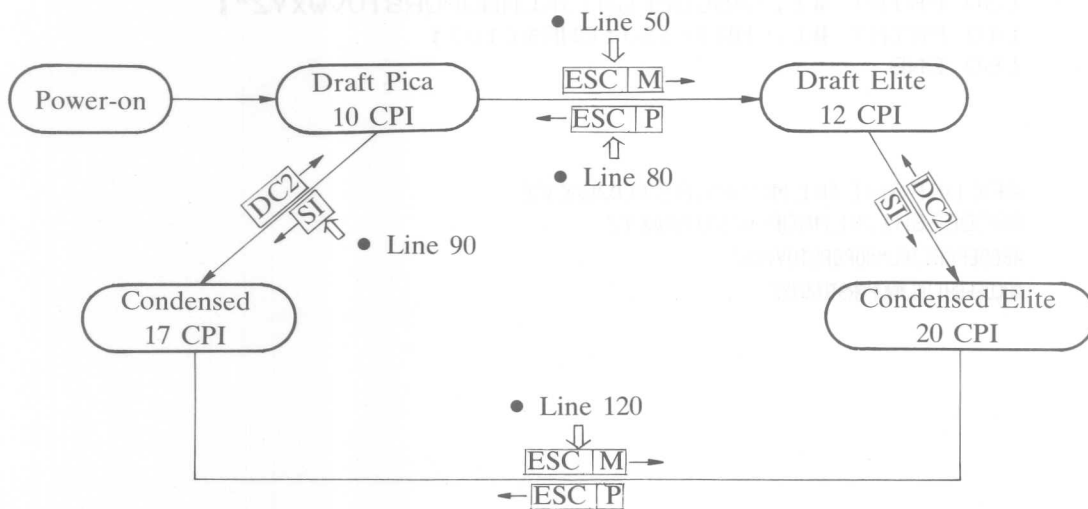


Lines 10 and 20 allow all 256 ASCII characters to be transmitted to the printer without change. In line 20, a width of 255 suppresses the automatic line feed after a carriage return (CHR\$(13)).

Line 30 outputs characters A through Z to the printer. They are printed in Draft Pica Mode because it is the printer's default mode at power-on.

Line 50 changes Pica to Elite mode before printing the characters output by line 60.

The reason why line 80 is needed to change the mode from Draft Elite to Condensed is shown in the flowchart below which was derived from "CHARACTER MODE TRANSITION" on page 52.



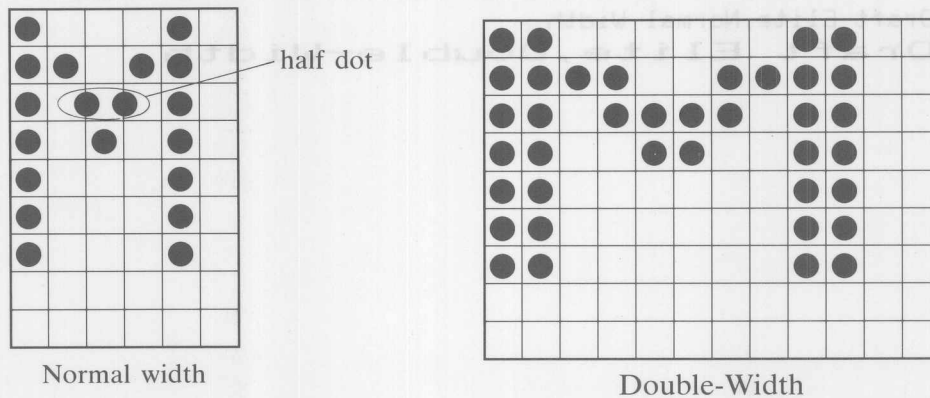
ESC is a symbol of code 27 in decimal, or code 1B in hexadecimal, represented by CHR\$(27) in Basic language.

SI is represented by CHR\$(15).

Run the program to see the different width characters.

## STEP 2. Double-Width Character

Dot matrix representations of normal width and double-width characters:



The 2 middle dots crossing the vertical lines of the normal width matrix are called 'half dots'.

A half dot cannot be printed if the horizontal leading dot is printed.

Switch the printer off and back on again to reset the printer before typing the following example program:

```

10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,"Draft Pica,Normal Width";
40 PRINT #1,CHR$(13);CHR$(10);
50 PRINT #1,CHR$(14);"Double-Width
60 PRINT #1,"Draft Pica,Double-Width";
70 PRINT #1,CHR$(13);CHR$(10);
80 PRINT #1,CHR$(27);"M";"Elite
90 PRINT #1,"Draft Elite,Normal Width";
100 PRINT #1,CHR$(13);CHR$(10);
110 PRINT #1,CHR$(14);"Double-Width
120 PRINT #1,"Draft Elite,Double-Width";
130 PRINT #1,CHR$(13);CHR$(10);
140 END

```

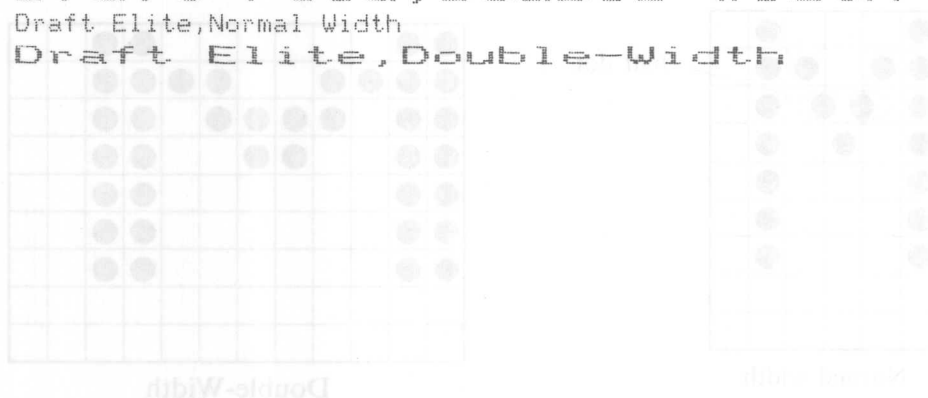
Line 50 designates Double-width mode, but it is valid only for the current line. That's why line 110 should be output to designate Double-width mode again. Another command to designate Double-width mode is:

```
PRINT #1,CHR$(27);"W1";
```

This command is valid until it is terminated.  
Refer to 'CONTROL CODES' for further details.

Run the program to print:

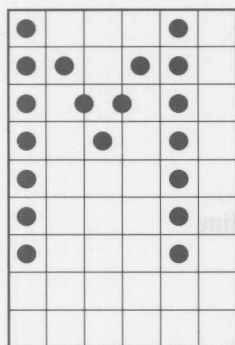
Draft Pica,Normal Width  
Draft Pica,Double-Width  
Draft Elite,Normal Width  
Draft Elite,Double-Width



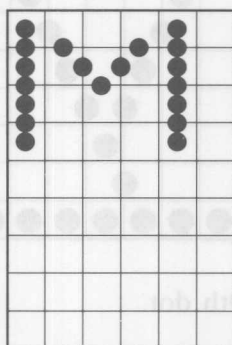
### STEP 3. Superscripts and Subscripts

Superscripts and Subscripts are printed in half-character height.

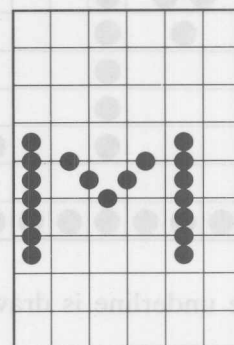
Dot matrix representations of normal height, Superscript, and Subscript characters:



Normal height



Superscript



Subscript

#### Program Example:

```

10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,"Draft Pica,Normal Height ";
40 PRINT #1,CHR$(27);"S0";`Superscript designation
50 PRINT #1,"Superscript";CHR$(13);CHR$(10);
60 PRINT #1,CHR$(27);"T";`Superscript termination
70 PRINT #1,"Normal Height again ";
80 PRINT #1,CHR$(27);"S1";`Subscript designation
90 PRINT #1,"Subscript";CHR$(13);CHR$(10);
100 PRINT #1,CHR$(27);"T";`Subscript termination
110 END

```

Line 60 shows that the `ESC T` command is output to return to normal character height.

If the above program is run the following is printed:

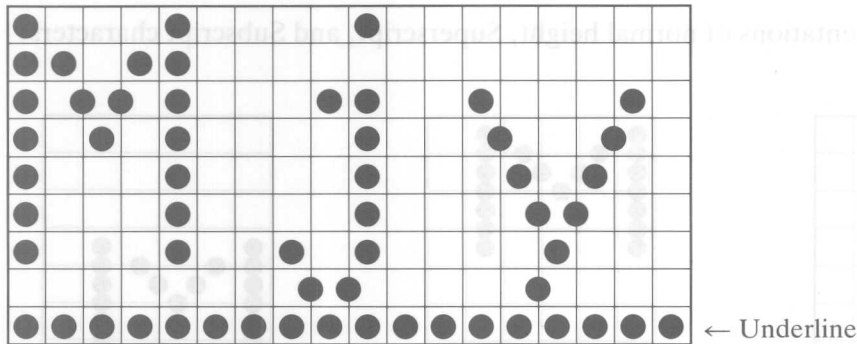
```

Draft Pica,Normal Height Superscript
Normal Height again subscript

```

## STEP 4. Underlining

Dot matrix representation of underlined characters:



The underline is drawn by the 9th dot.

### Program Example:

```
10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,"Lisa is ";
40 PRINT #1,CHR$(27);"-1"; 'Underline designation
50 PRINT #1,"a beautiful girl";
60 PRINT #1,CHR$(27);"-0"; 'Underline termination
70 PRINT #1," indeed.";CHR$(10)
80 END
```

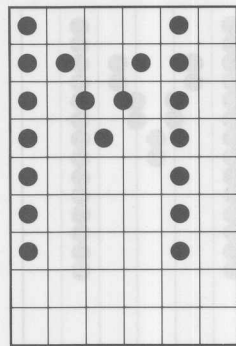
Line 40 outputs the `ESC[-1` command to start underlining and line 60 uses the `ESC[-0` command to stop underlining.

If the above program is run, the following is printed:

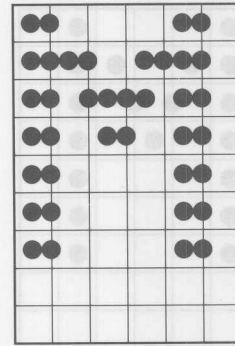
Lisa is a beautiful girl indeed.

**STEP 5. Emphasized Printing**

Dot matrix representation of emphasized character.



Normal



Emphasized

Emphasized printing causes each dot of a character to be doubled horizontally, creating a bold image as shown above.

**Program Example:**

```

10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,CHR$(27);"E";"Emphasized designation"
40 PRINT #1,"Emphasized printing";CHR$(13);CHR$(10);
50 PRINT #1,CHR$(27);"F";"Emphasized termination"
60 PRINT #1,"Back to Normal";CHR$(13);CHR$(10);
70 END

```

Line 30 outputs the **ESC E** command to set Emphasized printing mode.

Line 50 outputs the **ESC F** command to return to Normal printing mode.

**Print Sample:**

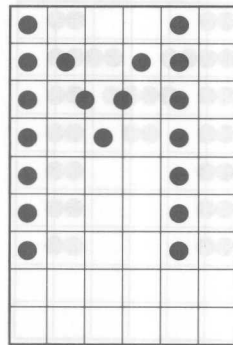
```

Emphasized printing
Back to Normal

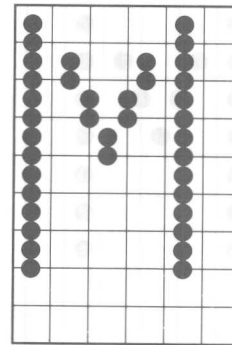
```

## STEP 6. Double-Strike Printing

Dot matrix representation of double-strike character.



Normal



Double-strike

In Double-strike printing mode, each dot of a character is doubled vertically, creating an enhanced image. This printing requires 2 passes of the print head.

### Program Example:

```
10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,CHR$(27);"G";'Double-strike designation
40 PRINT #1,"Double-strike printing";CHR$(13);CHR$(10);
50 PRINT #1,CHR$(27);"H";'Double-strike termination
60 PRINT #1,"Back to Normal"
70 END
```

Line 30 shows that the `[ESC]G` command is used to designate Double-strike printing mode.

### Print Sample:

```
Double-strike printing
Back to Normal
```



**STEP 7. Page Length Setting**

The page length is selectable in either inch or line increments through software control.

**7-1. Page length setting in inches.**

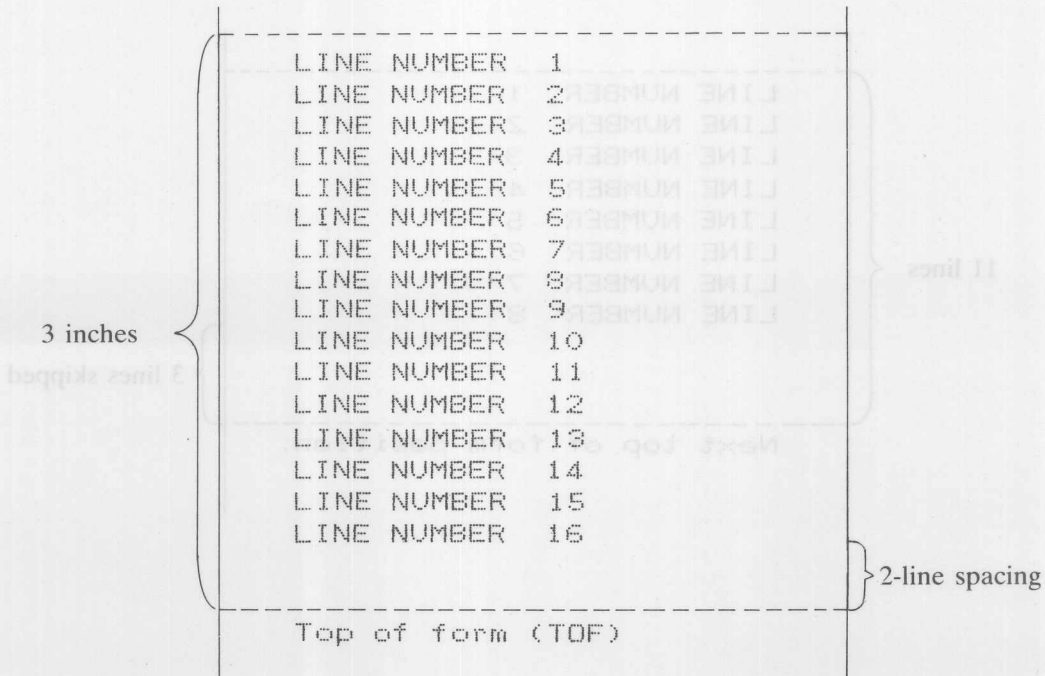
Let's see how many lines can be printed if the page length is set to 3 inches.

```

10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,CHR$(27);"C";CHR$(0);CHR$(3);
40 'Set page length to 3 inches
50 FOR I=1 TO 16
60 PRINT #1,"LINE NUMBER ";I;CHR$(10);
70 NEXT I
80 PRINT #1,CHR$(12);'Feed paper to next TOF
90 PRINT #1,"Top of form (TOF)"
100 END

```

Now run the program.



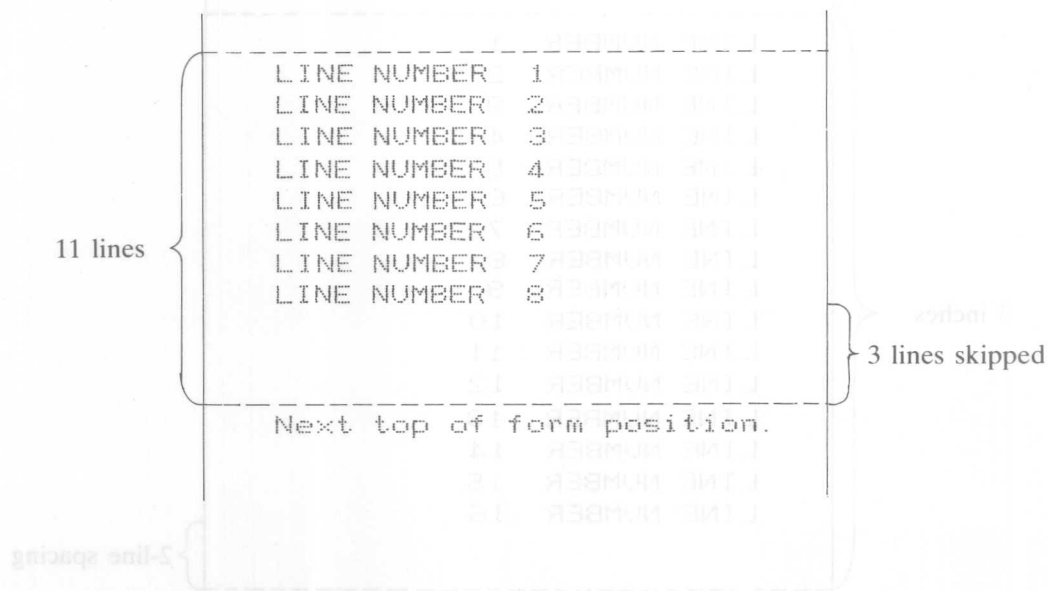
2 lines are skipped by the input of the `FF` code in line 80. Thus, a total of 18 lines can be printed per page when the page length is set to 3 inches. If you divide 3 inches by 18 lines, the result is 1/6 inch-per-line, which is equal to the one line default setting at power-on.

## 7-2. Page length setting in lines

The page length can also be set in line units. The physical length of a page depends on the line spacing at the time that the printer receives the command.

### Program Example:

```
10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,CHR$(27);"C";CHR$(11);'11 lines per page
40 FOR I=1 TO 8
50 PRINT #1,"LINE NUMBER ";I;CHR$(10);
60 NEXT I
70 PRINT #1,CHR$(12);'Feed paper to next TOF
80 PRINT #1,"Next top of form position."
90 END
```



Line 30 sets 11 lines as the page length. 3 lines are skipped due to the `FF` command in line 70.

## STEP 8. Horizontal Tab Setting

Horizontal tabs are set at every 8th column at power-on. The **[ESC][D]** command allows horizontal tab positions to be set.

### 8-1. Horizontal tabs at power-on

Notice the horizontal tabs set at power-on by running the program below.

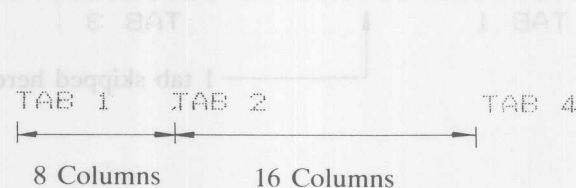
#### Program Example:

```

10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,"TAB 1";
40 PRINT #1,CHR$(9); 'Move to the next tab
50 PRINT #1,"TAB 2";
60 PRINT #1,CHR$(9);CHR$(9); 'Move to the tab after next
70 PRINT #1,"TAB 4"
80 END

```

#### Print Sample:



The number of columns between TAB2 and TAB4 is 16 because line 60 transmits 2 tab commands (CHR\$(9)) to the printer.

## 8-2. Horizontal tabs by software control

The program below shows how to set horizontal tab position.

### Program Example:

```

10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,"0123456789012345678901234567890123456789";
40 PRINT #1,CHR$(13);CHR$(10);
50 PRINT #1,CHR$(27);"D";CHR$(10);CHR$(20);CHR$(30);
60 PRINT #1,CHR$(40);CHR$(50);CHR$(0);
70 PRINT #1,"TAB 0";
80 PRINT #1,CHR$(9);"TAB 1";
90 PRINT #1,CHR$(9);CHR$(9);"TAB 3"
100 END

```

### Print Sample:

```

0123456789012345678901234567890123456789
TAB 0      TAB 1      TAB 3

```

↑  
1 tab skipped here

The tab stop positioned at the 20th column is skipped due to an extra CHR\$(9) command in line 90.

```

10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,"01234567890123456789";CHR$(13);CHR$(10);
40 PRINT #1,CHR$(27);"l";CHR$(10);'Left margin at 10th column
50 FOR I=32 TO 78
60 PRINT #1,CHR$(I);'Output character codes 32 to 78
70 NEXT I
80 PRINT #1,CHR$(10);
90 FOR I=79 TO 127
100 PRINT #1,CHR$(I);'Output character codes 79 to 127
110 NEXT I
120 PRINT #1,CHR$(10);'Line feed command
130 PRINT #1,CHR$(27);"I";CHR$(0);'Clear the left margin
140 END

```

Left margin position

↓

01234567890123456789  
!"#\$%&'()\*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN  
OPQRSTUVWXYZ[\]^\_`abcdefghijklmnopqrstuvwxyz{|}

10 characters

## 9-2. Right margin setting

Program example for setting the right margin:

```
10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,"01234567890123456789";CHR$(13);CHR$(10);
40 PRINT #1,CHR$(27);"Q";CHR$(15);'Right margin at 15th
50 FOR I=32 TO 127
60 PRINT #1,CHR$(I);'Output character codes 32 to 127
70 NEXT I
80 PRINT #1,CHR$(10);'Line feed command
90 PRINT #1,CHR$(27);"Q";CHR$(80);'Clear the right margin
100 END
```

Line 90 clears the right margin by designating the right margin as being at the 80th column. 80 columns are the maximum number of character columns in a line for Draft Pica mode.

### Print Sample:

Right margin position  
↓

```
01234567890123456789
!"#$%&'()*+,-.
/0123456789:;<=
>?@ABCDEFGHIJKL
MNOPQRSTUVWXYZ
[\]^_`abcdefghijklmnopqrstuvwxyz
klmnopqrstuvwxyz
z{}
```

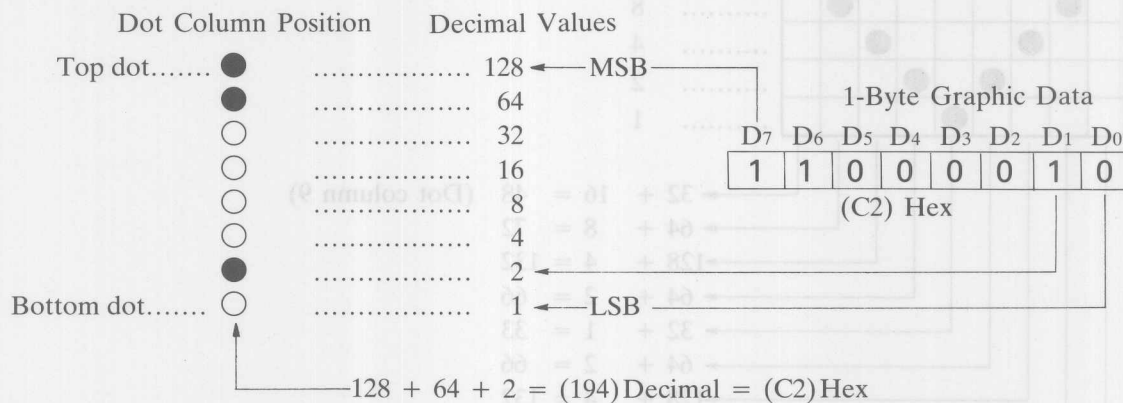
15 characters printable

15 characters at the beginning of each line can be printed by using the ESC Q command.

## STEP 10. Graphic Printing

Graphic commands allow the printer to draw any kind of picture by printing dots at any location on the page. This section describes how to input data for graphic printing.

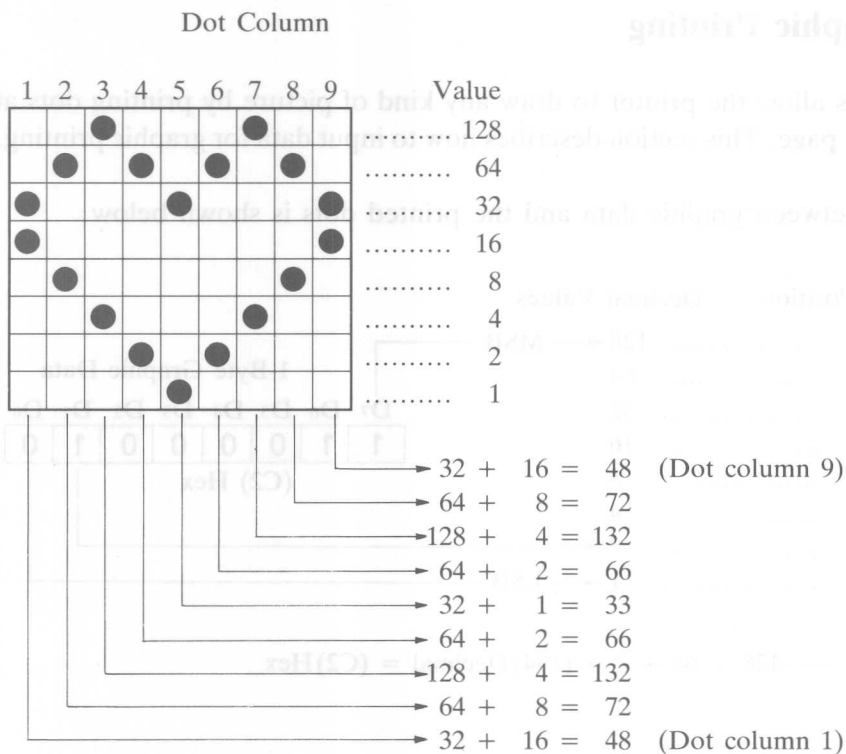
The relationship between graphic data and the printed dots is shown below:



“1” in the graphic data represents a dot and ‘0’ represents a blank. Thus, in order to print the top dot, the D7 bit of the graphic data must be 1. If you want to print the first, second and seventh dots from the top, the corresponding graphic data is to be calculated in the following manner:

$$128 (D_7) + 64 (D_6) + 2 (D_1) = 194 \text{ Decimal}$$

Now we can work through a simple program. Try drawing a heart mark on graph paper.



The graphic data for dot column 1 is equal to that for dot column 9 because the dots to be printed are the same.

Input the following program and run it to obtain the heart mark.

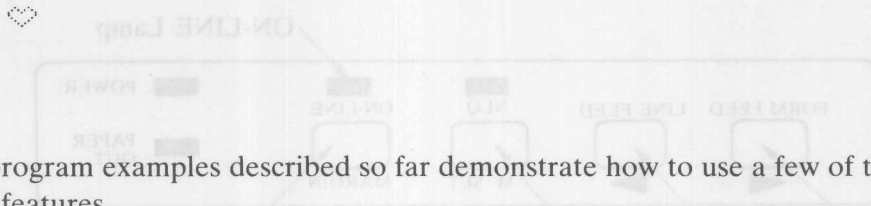
**Program example:**

```

10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,CHR$(27);"K";CHR$(9);CHR$(0);'Graphic designation
40 PRINT #1,CHR$(48);CHR$(72);CHR$(132);CHR$(66);
50 PRINT #1,CHR$(33);CHR$(66);CHR$(132);CHR$(72);CHR$(48);
60 PRINT #1,CHR$(10);
70 END
    
```



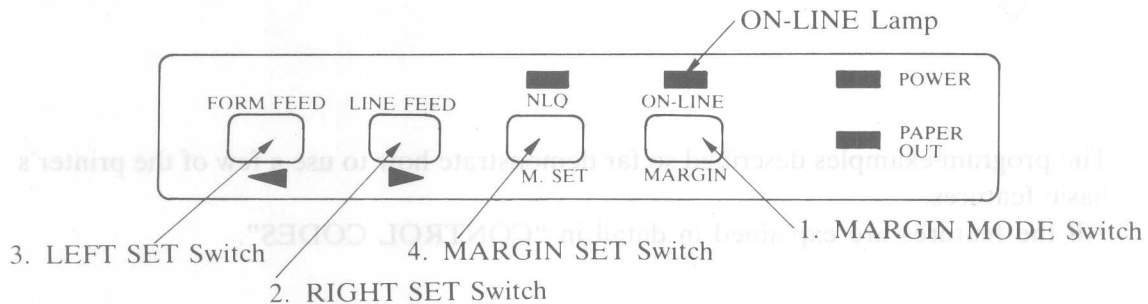
The above program will print the following:



The program examples described so far demonstrate how to use a few of the printer's basic features.

All the features are explained in detail in "CONTROL CODES".

## — MARGIN SETTING BY SWITCHES —



### 1. MARGIN MODE switch (Same as ON-LINE switch)

If this switch is pressed for more than 1 second in the ON-LINE state, the printer enters the right/left *margin set mode* (shown by the ON-LINE lamp going off and on every 0.3 seconds).

If pressed again, the printer returns to the ON-LINE state.

### 2. RIGHT SET switch (Same as LINE FEED switch)

(Valid only while in the margin set mode)

Pressing this switch moves the print head to the right of its present position. The margin position is located at the center of the print head.

### 3. LEFT SET switch (Same as FORM FEED switch)

(Valid only while in the margin set mode)

Pressing this switch moves the print head to the left of its present position. The margin position is located at the center of the print head.

### 4. MARGIN SET switch (Same as NLQ switch)

(Valid only while in the margin set mode)

Pressing this switch sets the margin positions.

The margins are set from left to right.

The printer returns to the ON-LINE state as soon as the right margin is set.

If only the left margin is to be set, set it and then press the MARGIN MODE switch.

If only the right margin is to be set, it must be set after the left margin.

The minimum margin setting possible is equivalent to the width of one double-width Pica character.

After the margin is set, the buzzer sounds for approximately 0.1 second.

The left margin cannot be set at a position beyond 5.6 inches (MP-1300) or 8.0 inches (MP-5300) away from the left end of printable area.

If the margin set is incorrect, the buzzer sounds for approximately 0.3 second and the PAPER OUT lamp blinks.

## **SELF-TEST**

If the LINE FEED or NLQ switch is pressed during power-on, a pattern is printed repeatedly. If the LINE FEED switch is pressed during power-on, the self-test is performed in Draft Character mode. If the NLQ switch is pressed during power-on, the self-test is performed in Near Letter Quality Character mode.

The printer is in the OFF-LINE state while performing the self-test. To stop the self-test (and turn on the ON-LINE lamp), press the ON-LINE switch.

If a paper out is detected during self-test printing, the self-test is terminated. The self-test does not start in the paper-out state.

## **AUTOMATIC PRINTING FUNCTION**

During data input, if the amount of data exceeds 1 line, printing is automatically performed. During graphic data input, if the amount of data exceeds 1 line, neither printing nor line feed is performed. Graphic data that exceeds 1 line is ignored.

## **—INPUT DATA HEXADECIMAL DUMP—**

The data that is input is printed out as 2-digit hexadecimal numbers. Therefore, it is possible to check data the printer has actually received.

To perform this function, hold down the FORM FEED switch at power-on till the initialization operation has finished.

Thereafter, 16 bytes of input data will be printed in a line at a time. If the amount of input data is less than 16 bytes and it is needed to print them all, press the ON-LINE switch.

After the printing, push the ON-LINE switch to return to the dump function from the OFF-LINE state. The Near Letter Quality Character mode can be set by pressing the NLQ switch while in the OFF-LINE mode.

This function can be terminated by one of the following 2 ways:

- (1) Turn power off, wait 2 seconds and then turn it back on again.
- (2) Input the INITIAL signal from the parallel interface.

### **Example:**

```
10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,"ABC"
40 PRINT #1,"123"
50 PRINT #1,"HENRY IS HANDSOME"
60 END
```

```
41 42 43 0D 31 32 33 0D 48 45 4E 52 59 20 49 53
20 48 41 4E 44 53 4F 4D 45 0D
```

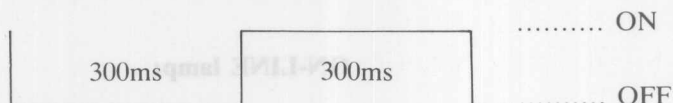
# **ERRORS**

If an error occurs, the buzzer sounds on and off and the PAPER OUT lamp blinks in the following cycles that vary depending upon the causes of error.

## **1. Home Position Detection Error**

If the home position is not detected during the home detection process.

**Buzzer and PAPER OUT lamp:**



This pattern is repeated.

## **2. RAM Error**

If an internal RAM error is detected during the initialization process.

**Buzzer and PAPER OUT lamp:**

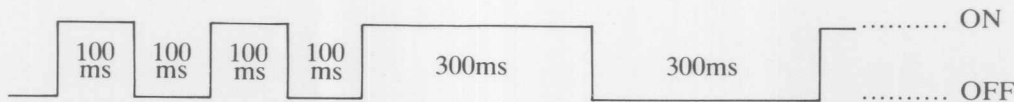


This pattern is repeated.

## **3. Abnormal Temperature Rise Error (MP-1300 only)**

If an abnormal temperature rise is detected in the printer.

**Buzzer and PAPER OUT lamp:**

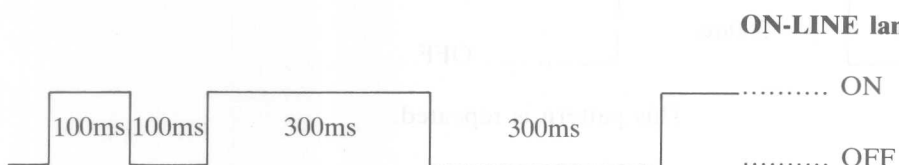


This pattern is repeated.

## PRINT HEAD PROTECTION

During high-density printing, when the print head's temperature increases to an abnormal level, the printing speed is automatically decreased or printing is temporarily halted. Heat detection is performed in 2 levels; when the first level is reached, printing is performed unidirectionally and when the second level is reached, printing is halted until the print head temperature goes down.

The ON-LINE lamp blinks in the following cycle while printing is halted because of reaching the second level.



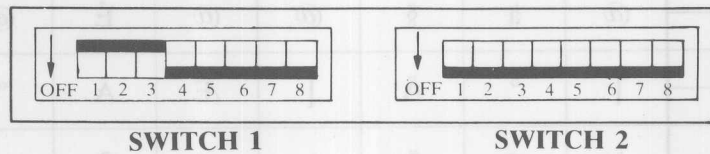
## DIP SWITCH SETTING

The switches are located at the back of the printer behind the plastic lid.

Perform all DIP switch selections with the power OFF.

The DIP switches are read after the initialization process either by turning the power switch on or inputting the **INITIAL** signal of the parallel interface.

When shipped from the factory, all switches except for international character switches are turned OFF.



### 1. DIP SWITCH BANK 1

Switch	Function	On	Off
1-1	International character	See Table 2	
1-2			
1-3			
1-4	Page length	12"	11"
1-5	Standard/IBM mode selection	IBM	Standard
1-6	Character set selection in IBM mode	Character set 2	Character set 1
	Download character in Standard mode	Valid	Invalid
1-7	CR code selection	CR + LF	AUTOFEED
1-8	Slashed or unslashed zero	Ø	0

**Table 1**

**Note 1:** Standard and IBM modes are selected only by using DIP switch 1-5. There is no control code to designate Standard or IBM mode.

**Note 2:** In Standard mode, DIP switch 1-6 determines whether a download character is valid or not. When a download character is valid, the MP-1300 communication buffer is reduced to 7K bytes from 10K bytes.

## International Characters Selected by DIP Switches

COUNTRY		U.S.A.	FRANCE	GERMANY	ENGLAND	DENMARK	SWEDEN	ITALY	SPAIN
DIP SWITCH	1-1	ON	ON	ON	ON	OFF	OFF	OFF	OFF
	1-2	ON	ON	OFF	OFF	ON	ON	OFF	OFF
	1-3	ON	OFF	ON	OFF	ON	OFF	ON	OFF
C  O  D  E	(23) Hex	#	#	#	£	#	#	#	Pt
	(35) Decimal								
	(24) H	\$	\$	\$	\$	\$	¤	\$	\$
	(36) D								
	(40) H	@	à	§	@	@	É	@	@
	(64) D								
	(5B) H	[	°	Ä	[	Æ	Ä	°	i
	(91) D								
	(5C) H	\	Ç	Ö	\	Ø	Ö	\	Ñ
	(92) D								
	(5D) H	]	§	Ü	]	Å	Å	é	¿
	(93) D								
	(5E) H	^	^	^	^	^	Ü	^	^
	(94) D								
	(60) H	`	`	`	`	`	é	ù	`
	(96) D								
	(7B) H	{	é	ä	{	æ	ä	à	¨
	(123) D								
	(7C) H		ù	ö		ø	ö	ò	ñ
	(124) D								
	(7D) H	}	è	ü	}	å	å	è	}
	(125) D								
	(7E) H	~	¨	ß	~	~	ü	ì	~
	(126) D								

Table 2

**Note 1:** These character selections are valid for all the character sets: Standard character set, IBM character set 1, and IBM character set 2.

**Note 2:** When DENMARK is selected by the DIP switches in IBM character set 2 mode, code (9B) Hex, or (155) Decimal will print 'ø' and code (9D) Hex, or (157) Decimal will print 'Ø'.

U.S.A.	#\$@[\]^_`{ }~
FRANCE	#\$à°ç§^`éùè¨
GERMANY	#\$§ÄÜ^`äüß
ENGLAND	£\$@[\]^_`{ }~
DENMARK	#\$@ÆØÅ^`æøå~
SWEDEN	#\$EÄÖÅÜéäüå
ITALY	#\$@°\`é^ùàòèì
SPAIN	£\$@;Ñ¿^`¨ñ}~



## 2. DIP SWITCH BANK 2

### a. CSF mode selection

DIP Switch	Selected	Not Selected
2-1	ON	OFF

### b. Serial transfer rates

DIP Switch	1200 BPS	2400 BPS	4800 BPS	9600 BPS
2-2	OFF	ON	OFF	ON
2-3	OFF	OFF	ON	ON

BPS: Bit Per Second

### c. Serial protocol and parallel selection

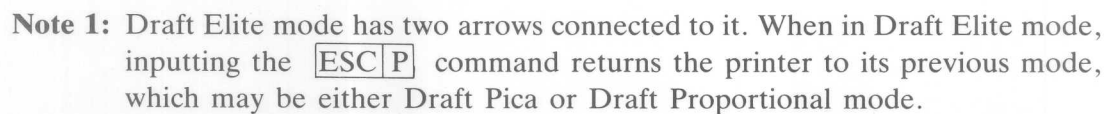
DIP Switch	Parallel	Serial		
		READY/BUSY	X-ON/X-OFF	ETX/ACK
2-4	OFF	ON	OFF	ON
2-5	OFF	OFF	ON	ON

### d. Parity selection

DIP Switch	No Parity		Odd Parity	Even Parity
2-6	OFF	ON	OFF	ON
2-7	OFF	OFF	ON	ON

### e. Serial data length

DIP Switch	7 bits	8 bits
2-8	ON	OFF



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# PRINT MODE PRIORITIES

The following table lists the priorities when different print modes are combined.

Mode	Elite	Proportional	Emphasized	Condensed
Elite		Elite	Emphasized Elite	Condensed Elite
Proportional	Elite		Emphasized Proportional	Proportional
Emphasized	Emphasized Elite	Emphasized Proportional		Emphasized
Condensed	Condensed Elite	Proportional	Emphasized	

The following priorities also exist:

Superscript/Subscript > NLQ > Double-strike

## — PRINT MODE SPECIFICATIONS —

\*: Includes half dot

Print Mode		Character Structure H × V + Space	MP-1300 Max. No. of Columns	MP-5300 Max. No. of Columns	Character Spacing CPI	Printing Speed CPS	Minimum Dot Spacing H × V inches	Character Size H × V mm (dot)	Number of passes	MP-1300 Color Print speed (CPS)
Draft	Pica	12* × 9	80	136	10	300	1/120* × 1/72	2.1 × 2.5 (9* × 7)	1	43-300
	Elite	12* × 9	96	163	12	180	1/144* × 1/72	1.8 × 2.5 (9* × 7)	1	33-180
	Condensed Elite	12* × 9	160	272	20	300	1/240* × 1/72	1.2 × 2.5 (9* × 7)	1	43-300
	Condensed	14* × 9	137	233	17	257	1/240* × 1/72	1.2 × 2.5 (9* × 7)	1	47-257
NLQ	Pica	24* × 18	80	136	10	50	1/240* × 1/144	2.3 × 2.5 (19* × 13)	2	11-50
	Elite	24* × 18	96	163	12	52	1/288* × 1/144	2.0 × 2.5 (19* × 13)	2	12-52
Draft Italic	Pica	16* × 9	80	136	10	150	1/240* × 1/72	2.7 × 2.5	1	21-150
	Elite	16* × 9	96	163	12	150	1/288* × 1/72	2.3 × 2.5	1	33-150
	Condensed Elite	16* × 9	160	272	20	300	1/240* × 1/72	1.9 × 2.5	1	43-300
	Condensed	16* × 9	137	233	17	257	1/240* × 1/72	1.9 × 2.5	1	47-257
NLQ Italic	Pica	32* × 18	80	136	10	50	1/480* × 1/144	2.9 × 2.5	2	11-50
	Elite	32* × 18	96	163	12	52	1/576* × 1/144	2.5 × 2.5	2	12-52
Graphics	Standard density	n × 8 or 9	480 dot	816 dot	—	1800 dot/s	1/60 × 1/72	—	1	225-1800 dot/s
	Double-density	n × 8 or 9	960 dot	1632 dot	—	1800 dot/s	1/120 × 1/72	—	1	300-1800 dot/s
	Double-speed, Double-density	n × 8	960* dot	1632* dot	—	3600* dot/s	1/120* × 1/72	—	1	450-3600 dot/s
	Quadruple-density	n × 8	1920* dot	3264* dot	—	3600* dot/s	1/240* × 1/72	—	1	281-3600 dot/s
	576 dot (979)	n × 8	576 dot	979 dot	—	1080 dot/s	1/72 × 1/72	—	1	90-1080 dot/s
	640 dot (1088)	n × 8	640 dot	1088 dot	—	1200 dot/s	1/80 × 1/72	—	1	100-1200 dot/s
	720 dot (1224)	n × 8	720 dot	1224 dot	—	1350 dot/s	1/90 × 1/72	—	1	112-1350 dot/s
	1152 dot (1958)	n × 8	1152 dot	1958 dot	—	1800 dot/s	1/144 × 1/72	—	1	-1800 dot/s

1. Draft Pica	ABCDEFGHIJKLMNOPQRSTUVWXYZ
2. Draft Elite	ABCDEFGHIJKLMNOPQRSTUVWXYZ
3. Draft Condensed Elite	ABCDEFGHIJKLMNOPQRSTUVWXYZ
4. Draft Condensed	ABCDEFGHIJKLMNOPQRSTUVWXYZ
5. NLQ Pica	ABCDEFGHIJKLMNOPQRSTUVWXYZ
6. NLQ Elite	ABCDEFGHIJKLMNOPQRSTUVWXYZ
7. Draft Italic Pica	<i>ABCDEFGHIJKLMNOPQRSTUVWXYZ</i>
8. Draft Italic Elite	<i>ABCDEFGHIJKLMNOPQRSTUVWXYZ</i>
9. Draft Italic Condensed Elite	<i>ABCDEFGHIJKLMNOPQRSTUVWXYZ</i>
10. Draft Italic Condensed	<i>ABCDEFGHIJKLMNOPQRSTUVWXYZ</i>
11. NLQ Italic Pica	<i>ABCDEFGHIJKLMNOPQRSTUVWXYZ</i>
12. NLQ Italic Elite	<i>ABCDEFGHIJKLMNOPQRSTUVWXYZ</i>

## —CONTROL CODES—

Program examples in this chapter are for the IBM-PC, when U.S.A. font is selected.

### • Print Commands

#### 1. **CR** (0D) Hexadecimal (13) Decimal

Input of this code initiates printing. If DIP switch 1-7 is ON, a linefeed is performed after printing. If print data is not input or if the input data is all space code, the print head does not move. The print data that is input after this command is printed at the left margin. In Standard mode, the **SO** or **ESC SO** double-width mode is terminated, if a linefeed is executed by this command.

In IBM mode, the **ESC 5 n** command determines whether a linefeed is performed or not by this command, and the **SO** or **ESC SO** double-width mode is always terminated.

#### Example:

```
10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 FOR I=1 TO 3
40 PRINT #1,"CARRIAGE";CHR$(13);'CR CODE 13
50 PRINT #1,"          RETURN";CHR$(141);'CR CODE 141
60 NEXT I
70 END
```

} Program  
list

CARRIAGE RETURN

} Printed  
sample

2. **LF** (0A) Hex (10) Decimal

Input of this code results in printing and a linefeed. The linefeed width is set by the linefeed amount command. If print data has not been input or if the input data is all space code, only a linefeed is performed. Print data that is input after this print command is printed at the left margin.

This command terminates the double-width character mode set by the **SO** or **ESC****SO** command.

```
10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 FOR I=1 TO 3
40 PRINT #1,"FIRST LINE ";I;CHR$(10);`LF CODE 10
50 PRINT #1,"NEXT LINE ";I;CHR$(138);`LF CODE 138
60 NEXT I
70 END
```

```
FIRST LINE 1
NEXT LINE 1
FIRST LINE 2
NEXT LINE 2
FIRST LINE 3
NEXT LINE 3
```

3. **FF****(0C)Hex (12)Decimal**

Input of this code results in printing and linefeeds being performed until the top of the next page is reached. The form feed value (1 page length) can be designated by DIP switch 1-4 at power-on.

This value can be altered by the **ESC C** command after power-on. The double-width character mode set by the **SO** or **ESC SO** command will be terminated if the **FF** command is input.

```

10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,CHR$(27);"C";CHR$(0);CHR$(2);
40 'SET PAGE LENGTH TO 2 INCHES
50 PRINT #1,"TOP OF PAGE 1 ";CHR$(13);CHR$(10);
60 PRINT #1,"LET'S PRINT WHATEVER YOU WANT";CHR$(13);
70 PRINT #1,CHR$(12);'FF CODE
80 PRINT #1,"TOP OF PAGE 2";CHR$(13);
90 PRINT #1,CHR$(12);'FF CODE
100 PRINT #1,"TOP OF PAGE 3";CHR$(13);
110 END

```

```

TOP OF PAGE 1
LET'S PRINT WHATEVER YOU WANT

```

```

TOP OF PAGE 2

```

```

TOP OF PAGE 3

```



4. **VT** (0B) Hex (11) Decimal

Input of this code initiates printing and performs a paperfeed until the next vertical tab that was previously set by the **ESC B** or **ESC b** command. If a vertical tab is not set, this command performs the same operation as the **LF** code. If at least one vertical tab is set and there is no setting until the next page, a paperfeed is carried out until the top of the next page is reached. The double-width character mode set by the **SO** or **ESC SO** command is terminated after executing this command.

```

10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,CHR$(27);"C";CHR$(0);CHR$(3);
40 'SET PAGE LENGTH TO 3 INCHES
50 PRINT #1,CHR$(27);"B";CHR$(1);CHR$(10);CHR$(12);CHR$(0);
60 'VERTICAL TABS SETTING AT 2ND,11TH AND 13TH LINE,
70 FOR I=1 TO 2
80 PRINT #1,"FIRST LINE";CHR$(11);'VT CODE IS 11
90 PRINT #1,"SECOND LINE";CHR$(11);'VT CODE 11
100 PRINT #1,"11TH LINE";CHR$(11);'VT CODE 11
110 PRINT #1,"13TH LINE";CHR$(139);'TOP OF NEXT PAGE
120 NEXT I
130 END

```

```

FIRST LINE
SECOND LINE

```

```

11TH LINE

```

```

13TH LINE

```

```

FIRST LINE
SECOND LINE

```

```

11TH LINE

```

```

13TH LINE

```

5. **ESC J n**

(1B, 4A, n)Hex (27, 74, n)Decimal

n is an 8-bit binary code,  $0 \leq n \leq 255$

Input of this code performs printing and an n/144 or n/216 inch linefeed. The amount of linefeed is not stored in the printer. In Standard mode, print data that is input after this command is printed at the next column of the last line.

In IBM mode, print data is printed at the left margin.

n/144 or n/216 inch is designated by the **GS n** command. n/216 inch is selected at power-on.

```
10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 FOR I=20 TO 180 STEP 20
40 PRINT #1,"LF";I;
50 PRINT #1,CHR$(27);"J";CHR$(I);
60 NEXT I
70 END
```

LF 20      LF 40

LF 60

LF 80

LF 100

LF 120

LF 140

LF 160

LF 180

6. **ESC j n****(1B, 6A, n)Hex (27, 106, n)Decimal**n is an 8-bit binary code,  $0 \leq n \leq 255$ 

Input of this code performs printing and a reverse linefeed of  $n/144$  or  $n/216$  inch. The amount of linefeed is not stored in the printer. In Standard mode, print data that is input after this command is printed at the next column of the last line. In IBM mode, print data is printed at the left margin.

Linefeed accuracy cannot be guaranteed if a reverse linefeed is performed. The **GS n** command designates  $n/144$  or  $n/216$  inch.  $n/216$  inch is selected at power-on.

```

10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 FOR I=20 TO 180 STEP 20
40 PRINT #1,"LF";I;
50 PRINT #1,CHR$(27);"j";CHR$(I);
60 NEXT I
70 END

```

LF 180

LF 160

LF 140

LF 120

LF 100

LF 80

LF 60

LF 20 LF 40

# CONTROL CODES

```

10 IBM MODE (DIP SWITCH 1-5 ON)
20 OPEN "LPT1:" AS #1
30 WIDTH #1,255
40 FOR I=20 TO 180 STEP 20
50 PRINT #1,"LF";I;
60 PRINT #1,CHR$(27);"j";CHR$(I);
70 NEXT I
80 END

```

LF 180

LF 160

LF 140

LF 120

LF 100

LF 80

LF 60

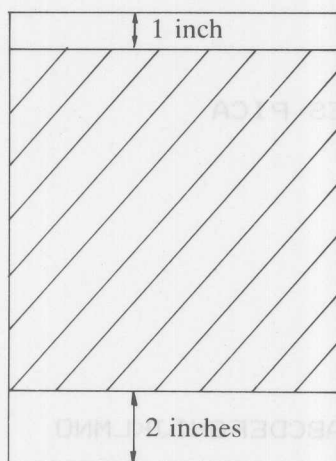
LF 40

LF 20

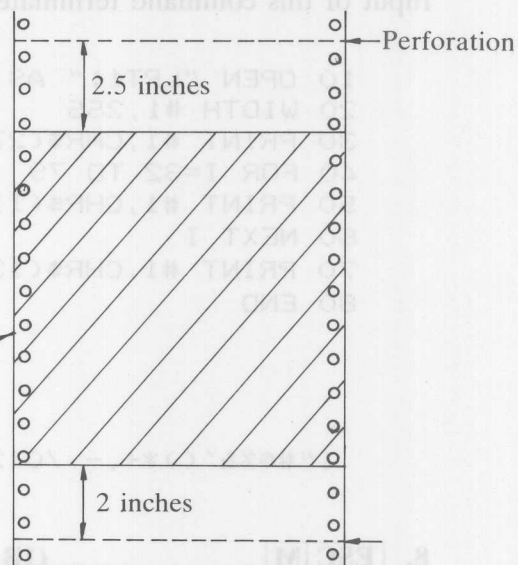
**Limited area allowed to perform reverse linefeeds.**

\* Reverse linefeed accuracy is not guaranteed.

● Cut Sheet



● Continuous Forms



**Note:** When using the tractor unit for continuous forms, a maximum of 2 reverse linefeeds can be performed within the above limited area.

## • Character Mode Designation

Refer to 'CHARACTER MODE TRANSITION' for further details.

### 7. **ESC P** (1B, 50) Hex (27, 80) Decimal

Input of this command terminates the Elite Character mode.

```
10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,CHR$(27);"P"; 'SPECIFIES PICA
40 FOR I=32 TO 79
50 PRINT #1,CHR$(I);
60 NEXT I
70 PRINT #1,CHR$(13);
80 END
```

!"#\$%&'()\*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO

### 8. **ESC M** (1B, 4D) Hex (27, 77) Decimal

Input of this command designates the Elite Character mode (12 character per inch).

```
10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,CHR$(27);"M"; 'SPECIFIES ELITE
40 FOR I=32 TO 79
50 PRINT #1,CHR$(I);
60 NEXT I
70 PRINT #1,CHR$(13);
80 END
```

!"#\$%&'()\*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO

9. **SI** (0F) Hex (15) Decimal

Input of this command designates the Condensed Character mode.

```
10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,CHR$(15); 'SPECIFIES CONDENSED
40 FOR I=32 TO 79
50 PRINT #1,CHR$(I);
60 NEXT I
70 PRINT #1,CHR$(13);
80 PRINT #1,CHR$(18) 'CANCELS CONDENSED
90 END
```

```
!"###&'()*+,-./0123456789;:<=>?@ABCDEFGHIJKLMNO
```

10. **ESC SI** (1B, 0F) Hex (27, 15) Decimal

This command is the same as the **SI** command.

Refer to 9.

11. **DC2** (12) Hex (18) Decimal

Input of this command terminates the Condensed Character mode designated by the **SI** or **ESC SI** command.

Refer to 9.

**12. ESC x 1 or (01) (1B, 78, 31 or 01) Hex (27, 120, 49 or 1) Decimal**

Input of this command designates the Near Letter Quality Character mode and turns the NLQ lamp on.

While in the Condensed Character mode, if this command is performed, Draft Characters are printed even though the NLQ lamp is on.

When the Condensed Character mode is terminated, NLQ printing is performed.

```

10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 FOR I=32 TO 79
40 PRINT #1,CHR$(I);
50 NEXT I
60 PRINT #1,CHR$(13);CHR$(10);
70 PRINT #1,CHR$(27);"x1"; 'SPECIFIES NLQ
80 FOR I=32 TO 79
90 PRINT #1,CHR$(I);
100 NEXT I
110 PRINT #1,CHR$(13);CHR$(10);
120 PRINT #1,CHR$(27);"x0"; 'CLEARS NLQ
130 END

```

```

!"#$%&'()*+,-./0123456789;=<=>?@ABCDEFGHIJKLMNO
!"#$%&'()*+,-./0123456789;=<=>?@ABCDEFGHIJKLMNO

```

```

10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,CHR$(15);
40 FOR I=32 TO 79
50 PRINT #1,CHR$(I);
60 NEXT I
70 PRINT #1,CHR$(13);CHR$(10);
80 PRINT #1,CHR$(27);"x1"; 'SPECIFIES NLQ
90 FOR I=32 TO 79
100 PRINT #1,CHR$(I);
110 NEXT I
120 PRINT #1,CHR$(13);CHR$(10);
130 PRINT #1,CHR$(18);CHR$(27);"x0"; 'CLEARS NLQ
140 END

```

```

!"#$%&'()*+,-./0123456789;=<=>?@ABCDEFGHIJKLMNO
!"#$%&'()*+,-./0123456789;=<=>?@ABCDEFGHIJKLMNO

```



13. **ESC x 0 or (00)** (1B, 78, 30 or 00) Hex (27, 120, 48 or 0) Decimal

Input of this command terminates the Near Letter Quality mode and turns the NLQ lamp off.

After this command is input the printer returns to the Draft Character mode.

Refer to 12.

**14. ESC p 1 or (01) (1B, 70, 31 or 01)Hex (27, 112, 49 or 1)Decimal**

Input of this command designates the Proportional Character mode. In this mode the space between characters varies. When comparing the Draft and NLQ Character modes, notice must be taken of the character widths and spacings that differ. The **BS** and **DEL** codes are ignored while in the Proportional character mode.

```
10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 FOR I=32 TO 79
40 PRINT #1,CHR$(I);
50 NEXT I
60 PRINT #1,CHR$(10);
70 PRINT #1,CHR$(27);"p1"; 'SPECIFIES PROPORTIONAL
80 FOR I=32 TO 79
90 PRINT #1,CHR$(I);
100 NEXT I
110 PRINT #1,CHR$(13);
120 PRINT #1,CHR$(27);"p0"; 'CLEARS PROPORTIONAL
130 END
```

```
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO
```

```
10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,CHR$(27);"x1"; 'SPECIFIES NLQ
40 FOR I=32 TO 79
50 PRINT #1,CHR$(I);
60 NEXT I
70 PRINT #1,CHR$(10);
80 PRINT #1,CHR$(27);"p1"; 'SPECIFIES PROPORTIONAL
90 FOR I=32 TO 79
100 PRINT #1,CHR$(I);
110 NEXT I
120 PRINT #1,CHR$(13);
130 PRINT #1,CHR$(27);"p0"; 'CLEARS PROPORTIONAL
140 PRINT #1,CHR$(27);"x0"; 'CLEARS NLQ
150 END
```

```
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO
```

15. **ESC p 0 or (00)** (1B, 70, 30 or 00)Hex (27, 112, 48 or 0)Decimal

Input of this command terminates the Proportional Character mode.

Refer to 14.

16. **ESC S 0 or (00)** (1B, 53, 30 or 00)Hex (27, 83, 48 or 0)Decimal

Input of this command designates the Superscript Character mode.

```
10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,"X";
40 PRINT #1,CHR$(27);"S0"; 'SPECIFIES SUPERScript
50 PRINT #1,"2";
60 PRINT #1,CHR$(27);"T"; 'CLEARs SUPERScript
70 PRINT #1,"+X=Y";CHR$(13);
80 END
```

This command is valid only in Standard mode. Input of this command designates the Superscript Character mode. All character data following this command is italic. This command is ignored during the printing of graphic data.

17. **ESC S 1 or (01)** (1B, 53, 31 or 01)Hex (27, 83, 49 or 1)Decimal

Input of this command designates the Subscript Character mode.

```
10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,CHR$(27);"x1"; 'SPECIFIES NLQ
40 PRINT #1,"H";
50 PRINT #1,CHR$(27);"S1"; 'SUBSCRIPT
60 PRINT #1,CHR$(15); 'SPECIFIES CONDENSED
70 PRINT #1,"2";
80 PRINT #1,CHR$(18); 'CLEARs CONDENSED
90 PRINT #1,CHR$(27);"T"; 'CLEARs SUBSCRIPT
100 PRINT #1,"S0";
110 PRINT #1,CHR$(27);"S1"; 'SUBSCRIPT
120 PRINT #1,CHR$(15); 'SPECIFIES CONDENSED
130 PRINT #1,"4";CHR$(10);
140 PRINT #1,CHR$(18); 'CLEARs CONDENSED
150 PRINT #1,CHR$(27);"T"; 'CLEARs SUBSCRIPT
160 PRINT #1,CHR$(27);"x0"; 'CLEARs NLQ
170 END
```

H<sub>2</sub>SO<sub>4</sub>

**18. ESC T (1B, 54) Hex (27, 84) Decimal**

Input of this command terminates the Superscript/Subscript Character mode. The Superscript/Subscript Character mode condenses a Draft character to 1/2 its original height. The characters are the same in either Draft or NLQ character mode.

If the Proportional Character mode is designated while in the Superscript/Subscript character mode, character widths and spacings become the same as in the Draft Characters mode. Thus if both Superscript/Subscript and Proportional Character modes are designated while in the NLQ character mode, character widths and spacing between characters are different from the case in which the Superscript/Subscript Character mode is not designated.

Refer to 16 and 17.

**19. ESC 4 (1B, 34) Hex (27, 52) Decimal**

This command is valid only in Standard mode. Input of this command designates the Italic Character mode. All character data following this command is printed in italic. This command is ignored during the printing of graphic data.

```
10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,CHR$(27);"4";:"ITALIC
40 PRINT #1,"ITALIC MODE ";
50 FOR I=&H30 TO &H4F
60 PRINT #1,CHR$(I);
70 NEXT I
80 PRINT #1,CHR$(13);CHR$(10);
90 PRINT #1,CHR$(27);"5";:"CANCELS ITALIC
100 PRINT #1,"NORMAL MODE ";
110 FOR I=&H30 TO &H4F
120 PRINT #1,CHR$(I);
130 NEXT I
140 PRINT #1,CHR$(13);CHR$(10);
150 END
```

```
ITALIC MODE 0123456789:;<=>?@ABCDEFGHIJKLMNO
NORMAL MODE 0123456789:;<=>?@ABCDEFGHIJKLMNO
```

**20. ESC 5 (1B, 35) Hex (27, 53) Decimal**

This command is valid only in Standard mode. Input of this command terminates the Italic Character mode.

Refer to 19.

**21. ESC ! n (1B, 21, n) Hex (27, 33, n) Decimal**  
 $0 \leq n \leq 255$ 

Input of this command designates mixed modes of the Elite, Proportional, Condensed, Emphasized, Double-strike, Double-width, and Underline modes by changing the value of n. When this command is performed, all previously set modes except NLQ and Superscript/Subscript modes are cleared and modes designated by n are set. Each bit of n designates the following modes.

MSB				LSB			
D7	D6	D5	D4	D3	D2	D1	D0
128	64	32	16	8	4	2	1

D7: Underline ..... MSB (Most Significant Bit)

D6: Italic

D5: Double-width

D4: Double-strike

D3: Emphasized

D2: Condensed

D1: Proportional

D0: Elite ..... LSB (Least Significant Bit)

**Note:** Outputting (1A)H code to the printer from the IBM PC.

```

1000 OUTPUT &H1A SUBROUTINE FOR PARALLEL PRINTER ADAPTER
1010 A=INP(&H379) AND &H80
1020 IF A=0 THEN GOTO 1010
1030 OUT &H37B,&H1A
1040 OUT &H37A,&HD
1050 OUT &H37A,&HC
1060 RETURN

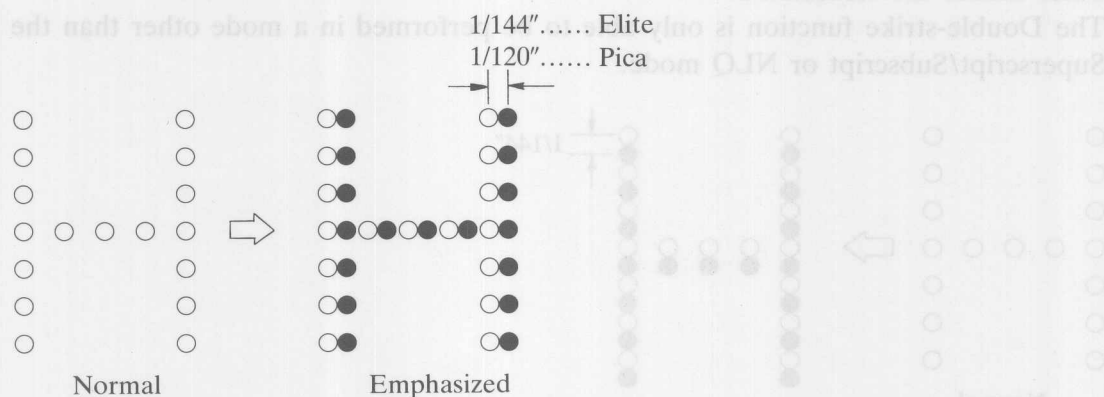
```

n= 0	ABCijk	n= 32	ABCijk	n= 64	ABCijk	n= 96	ABCijk
n= 1	ABCijk	n= 33	ABCijk	n= 65	ABCijk	n= 97	ABCijk
n= 2	ABCijk	n= 34	ABCijk	n= 66	ABCijk	n= 98	ABCijk
n= 3	ABCijk	n= 35	ABCijk	n= 67	ABCijk	n= 99	ABCijk
n= 4	ABCijk	n= 36	ABCijk	n= 68	ABCijk	n= 100	ABCijk
n= 5	ABCijk	n= 37	ABCijk	n= 69	ABCijk	n= 101	ABCijk
n= 6	ABCijk	n= 38	ABCijk	n= 70	ABCijk	n= 102	ABCijk
n= 7	ABCijk	n= 39	ABCijk	n= 71	ABCijk	n= 103	ABCijk
n= 8	ABCijk	n= 40	ABCijk	n= 72	ABCijk	n= 104	ABCijk
n= 9	ABCijk	n= 41	ABCijk	n= 73	ABCijk	n= 105	ABCijk
n= 10	ABCijk	n= 42	ABCijk	n= 74	ABCijk	n= 106	ABCijk
n= 11	ABCijk	n= 43	ABCijk	n= 75	ABCijk	n= 107	ABCijk
n= 12	ABCijk	n= 44	ABCijk	n= 76	ABCijk	n= 108	ABCijk
n= 13	ABCijk	n= 45	ABCijk	n= 77	ABCijk	n= 109	ABCijk
n= 14	ABCijk	n= 46	ABCijk	n= 78	ABCijk	n= 110	ABCijk
n= 15	ABCijk	n= 47	ABCijk	n= 79	ABCijk	n= 111	ABCijk
n= 16	ABCijk	n= 48	ABCijk	n= 80	ABCijk	n= 112	ABCijk
n= 17	ABCijk	n= 49	ABCijk	n= 81	ABCijk	n= 113	ABCijk
n= 18	ABCijk	n= 50	ABCijk	n= 82	ABCijk	n= 114	ABCijk
n= 19	ABCijk	n= 51	ABCijk	n= 83	ABCijk	n= 115	ABCijk
n= 20	ABCijk	n= 52	ABCijk	n= 84	ABCijk	n= 116	ABCijk
n= 21	ABCijk	n= 53	ABCijk	n= 85	ABCijk	n= 117	ABCijk
n= 22	ABCijk	n= 54	ABCijk	n= 86	ABCijk	n= 118	ABCijk
n= 23	ABCijk	n= 55	ABCijk	n= 87	ABCijk	n= 119	ABCijk
n= 24	ABCijk	n= 56	ABCijk	n= 88	ABCijk	n= 120	ABCijk
n= 25	ABCijk	n= 57	ABCijk	n= 89	ABCijk	n= 121	ABCijk
n= 26	ABCijk	n= 58	ABCijk	n= 90	ABCijk	n= 122	ABCijk
n= 27	ABCijk	n= 59	ABCijk	n= 91	ABCijk	n= 123	ABCijk
n= 28	ABCijk	n= 60	ABCijk	n= 92	ABCijk	n= 124	ABCijk
n= 29	ABCijk	n= 61	ABCijk	n= 93	ABCijk	n= 125	ABCijk
n= 30	ABCijk	n= 62	ABCijk	n= 94	ABCijk	n= 126	ABCijk
n= 31	ABCijk	n= 63	ABCijk	n= 95	ABCijk	n= 127	ABCijk

## ● Emphasized Character

### 22. **[ESC][E]** (1B, 45)Hex (27, 69)Decimal

Input of this command designates the Emphasized Character mode. In this mode, the print head moves half a dot to the right to re-print the same character. If this command is set while in the Condensed Character mode, Emphasized Pica (10 cpi) characters are printed. If the Emphasized Character mode is first terminated by the **[ESC][F]** command, the printer returns to the Condensed Character mode (17 cpi).



```
10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,CHR$(27);"E";"EMPHASIZED"
40 PRINT #1,"EMPHASIZED CHARACTER";CHR$(10);
50 PRINT #1,CHR$(27);"F";"CANCELS EMPHASIZED"
60 PRINT #1,"NORMAL CHARACTER";CHR$(10);
70 END
```

EMPHASIZED CHARACTER  
NORMAL CHARACTER

### 23. **[ESC][F]** (1B, 46)Hex (27, 70)Decimal

Input of this command terminates the Emphasized Character mode.

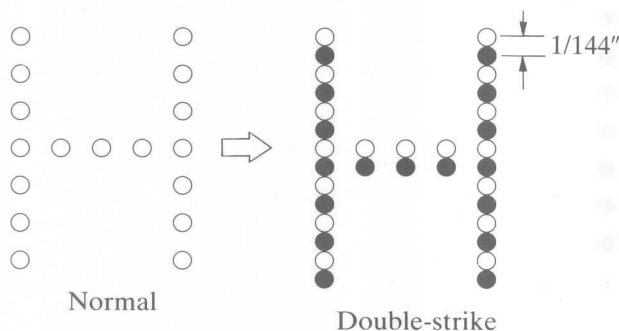
Refer to 22.

## • Double-strike Character

### 24. **ESC G** (1B, 47)Hex (27, 71)Decimal

Input of this command designates the Double-strike Character mode. In this mode, the paper moves up 1/144 inch and prints the same character once again. If the Double-strike Character mode is set and is overlapped with the Superscript/Subscript or the NLQ Character mode, the Superscript/Subscript mode or the NLQ Character mode is given priority. The printer returns to the Double-strike Character mode once the other modes are terminated.

The Double-strike function is only able to be performed in a mode other than the Superscript/Subscript or NLQ mode.



```

10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,CHR$(27)"P";'PICA
40 GOSUB 140
50 PRINT #1,CHR$(27)"M";'ELITE
60 GOSUB 140
70 PRINT #1,CHR$(15);'CONDENSED
80 GOSUB 140
90 PRINT #1,CHR$(18);'CANCELS CONDENSED
100 PRINT #1,CHR$(27)"4";'ITALIC
110 GOSUB 140
120 PRINT #1,CHR$(27)"5";'CANCELS ITALIC
130 END
140 PRINT #1,"SINGLE STRIKE  ";
150 PRINT #1,CHR$(27);"G";'DOUBLE STRIKE
160 PRINT #1,"DOUBLE STRIKE";
170 PRINT #1,CHR$(27);"H";'CANCELS DOUBLE STRIKE
180 PRINT #1,CHR$(13);CHR$(10);
190 RETURN

```

```

SINGLE STRIKE  DOUBLE STRIKE
SINGLE STRIKE  DOUBLE STRIKE
SINGLE STRIKE  DOUBLE STRIKE
SINGLE STRIKE  DOUBLE STRIKE

```



**25. [ESC]H (1B, 48)Hex (27, 72)Decimal**

Input of this command terminates the Double-strike Character mode.

Refer to 24.

## • Double-width Character

**26. [SO] (0E)Hex (14)Decimal**

Input of this command designates the Double-width Character mode. This command is invalid for graphic data. If more than a single line of character data is input, printing and a linefeed are automatically performed and this command is terminated.

This command is also terminated by the [DC4], [ESC]W[n] or linefeed commands other than the [ESC]J[n] and [ESC]j[n] commands.

```
10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,CHR$(14); "DOUBLE WIDTH"
40 PRINT #1,"DOUBLE ";
50 PRINT #1,CHR$(20); "CLEARS DOUBE WIDTH"
60 PRINT #1,"NORMAL ";
70 PRINT #1,CHR$(14); "WIDTH"; CHR$(13); CHR$(10);
80 PRINT #1,"YOU CAN SEE THE DOUBLE WIDTH"; CHR$(13); CHR$(10);
90 PRINT #1,"IS CLEARED AFTER A LINE FEED."
100 END
```

```
DOUBLE    NORMAL WIDTH
YOU CAN SEE THE DOUBLE WIDTH
IS CLEARED AFTER A LINE FEED.
```

**27. [ESC]SO (1B, 0E)Hex (27, 14)Decimal**

Same as the [SO] command.

Refer to 26.

**28. [DC4] (14)Hex (20)Decimal**

Input of this command terminates the Double-width Character mode command designated by the [SO] command.

Refer to 26.

**29. `[ESC] W 1 or (01)` (1B, 57, 31 or 01)Hex (27, 87, 49 or 1)Decimal**

Input of this command designates the Double-width Character mode that will not be terminated by a linefeed.

```
10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,CHR$(27)"W1"; "DOUBLE WIDTH
40 PRINT #1,"DOUBLE WIDTH IS NOT CANCELLED";CHR$(13);CHR$(10);
50 PRINT #1,"AFTER A LINE FEED."CHR$(13);
60 PRINT #1,CHR$(27)"W0"; "CLEARS IT
70 END
```

DOUBLE WIDTH IS NOT CANCELLED  
AFTER A LINE FEED.

**30. `[ESC] W 0 or (00)` (1B, 57, 30 or 00)Hex (27, 87, 48 or 0)Decimal**

Input of this command terminates the Double-width Character mode of `[ESC] W 01` that is not terminated by a linefeed command. The Double-width Character mode designated by the `[SO]` command is also terminated.

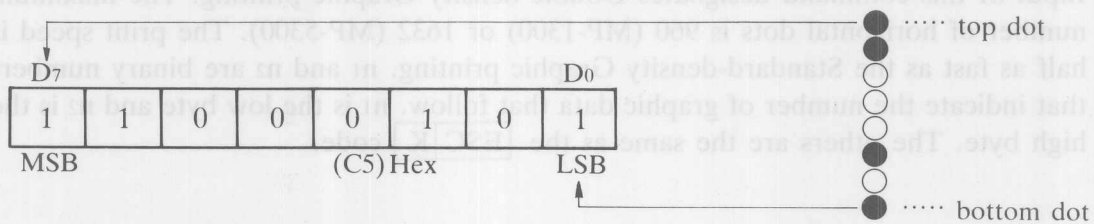
Refer to 29.

## • Graphic Mode

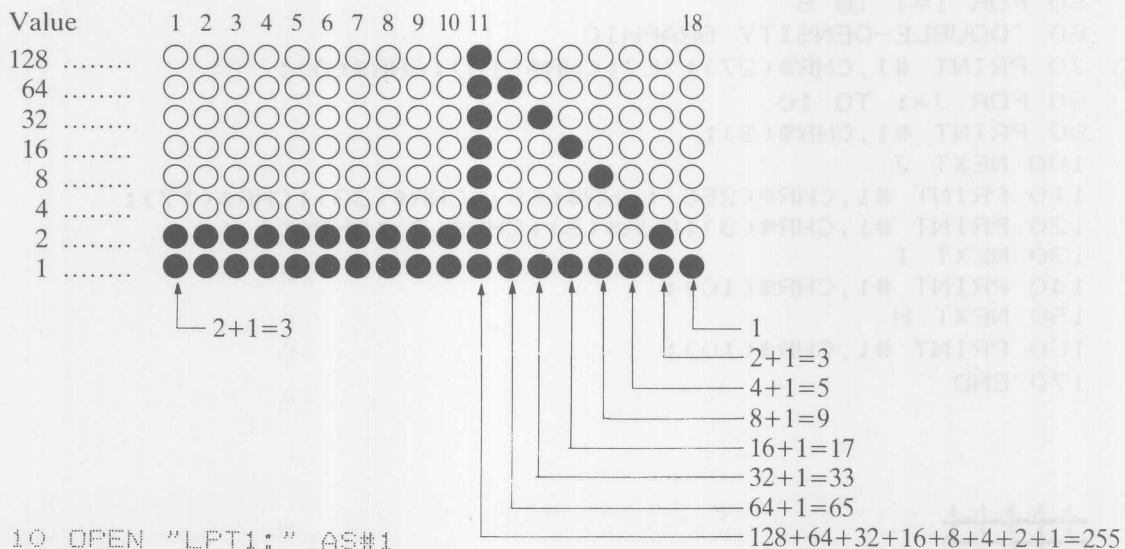
**31. `[ESC] K n1 n2` (1B, 4B, n1, n2)Hex (27, 75, n1, n2)Decimal**

Input of this command designates Standard-density Graphic printing. The maximum number of horizontal dots is 480 (MP-1300) or 816 (MP-5300). n1 and n2 are binary numbers that specify the graphic data number. The graphic data number is calculated as  $n1 + 256 \times n2$ . n2 is the high order byte and n1 is the low order byte. After this command, the printer returns to the prior print state. If n1 and n2 specify a number that exceeds a single line worth of dots, automatic printing is not performed and the exceeding dots are cleared.

## Graphic Data and the Corresponding Dots



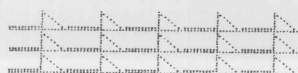
Inputting the `[ESC] A (08)` command is useful in the graphic mode since patterns then appear continuous.



```

10 OPEN "LPT1:" AS#1
20 WIDTH #1,255
30 PRINT #1,CHR$(27);"A";CHR$(8);"SET LINEFEED PITCH"
40 FOR H=1 TO 3
50 FOR I=1 TO 5
60 'STANDARD-DENSITY GRAPHIC
70 PRINT #1,CHR$(27);"K";CHR$(18);CHR$(0);
80 FOR J=1 TO 10
90 PRINT #1,CHR$(3);
100 NEXT J
110 PRINT #1,CHR$(255);CHR$(65);CHR$(33);CHR$(17);
120 PRINT #1,CHR$(9);CHR$(5);CHR$(3);CHR$(1);
130 NEXT I
140 PRINT #1,CHR$(10);
150 NEXT H
160 PRINT #1,CHR$(10);
170 END

```



32. **ESC L** **n1 n2**

(1B, 4C, n1, n2)Hex (27, 76, n1, n2)Decimal

Input of this command designates Double-density Graphic printing. The maximum number of horizontal dots is 960 (MP-1300) or 1632 (MP-5300). The print speed is half as fast as the Standard-density Graphic printing. n1 and n2 are binary numbers that indicate the number of graphic data that follow. n1 is the low byte and n2 is the high byte. The others are the same as the **ESC K** code.

```

10 OPEN "LPT1:" AS#1
20 WIDTH #1,255
30 PRINT #1,CHR$(27);"A";CHR$(8);"SET LINEFEED PITCH"
40 FOR H=1 TO 3
50 FOR I=1 TO 5
60 "DOUBLE-DENSITY GRAPHIC
70 PRINT #1,CHR$(27);"L";CHR$(18);CHR$(0);
80 FOR J=1 TO 10
90 PRINT #1,CHR$(3);
100 NEXT J
110 PRINT #1,CHR$(255);CHR$(65);CHR$(33);CHR$(17);
120 PRINT #1,CHR$(9);CHR$(5);CHR$(3);CHR$(1);
130 NEXT I
140 PRINT #1,CHR$(10);
150 NEXT H
160 PRINT #1,CHR$(10);
170 END

```

```

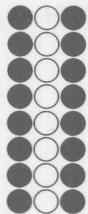
AAAAA
AAAAA
AAAAA

```

### 33. **ESC Y** **n1** **n2** (1B, 59, n1, n2)Hex (27, 89, n1, n2)Decimal

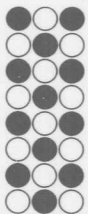
Input of this command designates the Double-speed Double-density Graphic printing. The maximum number of horizontal dots is 960 (MP-1300) or 1632 (MP-5300). Horizontally aligned dots are not printed. Therefore, the number of dots that can be printed continuously in a horizontal direction is 480 (MP-1300) or 816 (MP-5300). The print speed is the same as the Standard-density Graphic mode. The rest is the same as the **ESC K** command.

**Example 1.** Input data: (1B, 59, 03, 00, FF, FF, FF)Hex



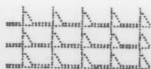
The second dot column cannot be printed.

**Example 2.** Input data: (1B, 59, 03, 00, AA, 55, AA)Hex



All the dots specified in this case can be printed.

```
10 OPEN "LPT1:" AS#1
20 WIDTH #1,255
30 PRINT #1,CHR$(27);"A";CHR$(8);'SET LINEFEED PITCH
40 FOR H=1 TO 3
50 FOR I=1 TO 5
60 'DOUBLE-SPEED DOUBLE-DENSITY GRAPHIC
70 PRINT #1,CHR$(27);"Y";CHR$(18);CHR$(0);
80 FOR J=1 TO 10
90 PRINT #1,CHR$(3);
100 NEXT J
110 PRINT #1,CHR$(255);CHR$(65);CHR$(33);CHR$(17);
120 PRINT #1,CHR$(9);CHR$(5);CHR$(3);CHR$(1);
130 NEXT I
140 PRINT #1,CHR$(10);
150 NEXT H
160 PRINT #1,CHR$(10);
170 END
```



**34. ESC Z n1 n2 (1B, 5A, n1, n2)Hex (27, 90, n1, n2)Decimal**

Input of this command designates Quadruple-density Graphic mode. The maximum number of horizontal dots is 1920 (MP-1300) or 3264 (MP-5300). Horizontally aligned dots are not printed. Therefore, the number of dots that can be printed continuously in a horizontal direction is 960 (MP-1300) or 1632 (MP-5300). The printing speed is the same as the Double-density Graphic speed. The rest is the same as the ESC K command.

```

10 OPEN "LPT1:" AS#1
20 WIDTH #1,255
30 PRINT #1,CHR$(27);"A";CHR$(8);"SET LINEFEED PITCH"
40 FOR H=1 TO 3
50 FOR I=1 TO 5
60 "QUADRUPLE-DENSITY GRAPHIC
70 PRINT #1,CHR$(27);"Z";CHR$(18);CHR$(0);
80 FOR J=1 TO 10
90 PRINT #1,CHR$(3);
100 NEXT J
110 PRINT #1,CHR$(255);CHR$(65);CHR$(33);CHR$(17);
120 PRINT #1,CHR$(9);CHR$(5);CHR$(3);CHR$(1);
130 NEXT I
140 PRINT #1,CHR$(10);
150 NEXT H
160 PRINT #1,CHR$(10);
170 END

```



**35. ESC \* m n1 n2 (1B, 2A, m, n1, n2)Hex (27, 42, m, n1, n2)Decimal**

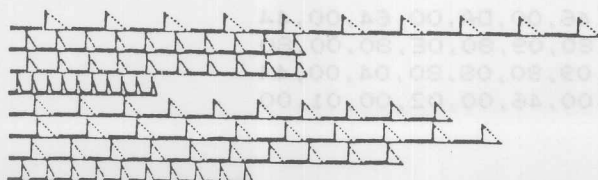
Input of this command allows Graphic types to be printed. As shown below in the table, m determines the following print types. As in the ESC K command, n1 and n2 are the Graphic Data numbers. When  $m \geq 8$ , the five bytes of this command and the number of bytes of the following graphic data designated by n1 and n2 are ignored.

m	Graphic Type	1 Line Dot Number		Horizontal Dot Spacing	Vertical: Horizontal	Equivalent Commands
		MP-1300 (8")	MP-5300 (13.6")			
0	Standard-density Graphic	480 dots	816 dots	1/60 inch	1:1.2	ESC, K
1	Double-density Graphic	960 dots	1632 dots	1/120 inch	1:0.6	ESC, L
2	Double-speed Double-density Graphic	960 dots	1632 dots	1/120 inch	1:0.6	ESC, Y
3	Quadruple-density Graphic	1920 dots	3264 dots	1/240 inch	1:0.3	ESC, Z
4	640 Dot/1088 Dot Graphic	640 dots	1088 dots	1/80 inch	1:0.9	—
5	576 Dot/ 979 Dot Graphic	576 dots	979 dots	1/72 inch	1:1	—
6	720 Dot/1224 Dot Graphic	720 dots	1224 dots	1/90 inch	1:0.8	—
7	1152 Dot/1958 Dot Graphic	1152 dots	1958 dots	1/144 inch	1:0.5	—

```

10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 FOR H=0 TO 7
40 PRINT #1,CHR$(27);"A";CHR$(8);"SET LINEFEED PITCH"
50 FOR I=1 TO 10
60 GRAPHIC SELECTION
70 PRINT #1,CHR$(27);"*";CHR$(H);CHR$(18);CHR$(0);
80 FOR J=1 TO 10
90 PRINT #1,CHR$(3);
100 NEXT J
110 PRINT #1,CHR$(255);CHR$(65);CHR$(33);CHR$(17);CHR$(9);
120 PRINT #1,CHR$(5);CHR$(3);CHR$(1);
130 NEXT I
140 PRINT #1,CHR$(10);
150 NEXT H
160 END

```



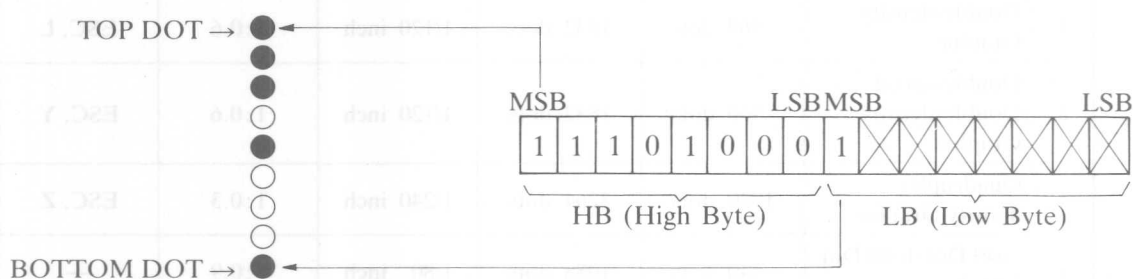
36. **ESC ^ a n1 n2 HB LB****(1B, 5E, a, n1, n2)Hex (27, 94, a, n1, n2)Decimal**

Input of this command designates the 9-pin graphic mode.

The maximum number of horizontal dots of the MP-1300 is 480 when a = 0 and it is 960 when a = 1. For the MP-5300, it is 816 when a = 0 and it is 1632 when a = 1.

Since 1 dot column is composed of 9 vertical dots, 2 bytes are used to designate a data. The rest is the same as the **ESC K** command.**Example:**

☒: Don't care



```

10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,CHR$(27);"A";CHR$(9);
40 PRINT #1,CHR$(&H1B);"~";CHR$(0);CHR$(19);CHR$(0);
50 FOR I=1 TO 38
60 READ A$
70 B=VAL("&H"+A$)
80 PRINT #1,CHR$(B);
90 NEXT I
100 PRINT #1,CHR$(10);
110 '
120 DATA 00,00,00,00,00,00,04,00,04
130 DATA 80,0D,00,16,00,24,00,40,00
140 DATA 80,00,80,00,80,00,80,00,40
150 DATA 00,24,00,16,00,0D,00,04,80,04,00
160 '
170 PRINT #1,CHR$(&H1B);"~";CHR$(0);CHR$(22);CHR$(0);
180 FOR I=1 TO 44
190 READ A$
200 B=VAL("&H"+A$)
210 PRINT #1,CHR$(B);
220 NEXT I
230 PRINT #1,CHR$(10);
240 '
250 DATA 01,00,02,00,46,00,DA,00,64,00,44
260 DATA 00,04,00,08,80,09,80,0E,80,00,80
270 DATA 00,80,0E,80,09,80,08,80,04,00,44
280 DATA 00,64,00,DA,00,46,00,02,00,01,00
290 END

```





37. **ESC ? n m** (1B, 3F, n, m)Hex (27, 63, n, m)Decimal  
 $n = K, L, Y, Z \quad 0 \leq m \leq 7$

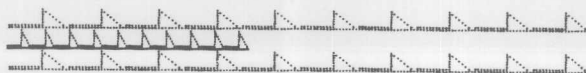
Input of this command assigns one of the graphic modes listed under the **ESC \*** command section to any one of the **ESC K**, **ESC L**, **ESC Y**, and **ESC Z** commands that will be input later. Refer to m in the **ESC \*** command which is identical to m in this command.

m	Graphic Type (MP-1300)	Graphic Type (MP-5300)
0	Standard-density	Standard-density
1	Double-density	Double-density
2	Double-speed Double-density	Double-speed Double-density
3	Quadruple-density	Quadruple-density
4	640 dots	1088 dots
5	576 dots	979 dots
6	720 dots	1224 dots
7	1152 dots	1958 dots

```

10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 GOSUB 500
40 'ASSIGN STANDARD DENSITY TO 1152 DOT GRAPHIC
50 PRINT #1,CHR$(27);"?K";CHR$(7);
60 GOSUB 500
70 'RETURN TO STANDARD DENSITY
80 PRINT #1,CHR$(27);"?K";CHR$(0);
90 GOSUB 500
100 END
500 'OUTPUTTING 100 DATA OF STANDARD DENSITY
510 PRINT #1,CHR$(27);"A";CHR$(8);'SET LINEFEED PITCH
520 FOR I=1 TO 10
530 PRINT #1,CHR$(27);"K";CHR$(18);CHR$(0);
540 FOR J=1 TO 10
550 PRINT #1,CHR$(3);
560 NEXT J
570 PRINT #1,CHR$(255);CHR$(65);CHR$(33);CHR$(17);CHR$(9);
580 PRINT #1,CHR$(5);CHR$(3);CHR$(1);
590 NEXT I
600 PRINT #1,CHR$(10);
610 RETURN

```



# • Linefeed Pitch

## 38. **[ESC 0]** (1B, 30)Hex (27, 48)Decimal

Input of this command designates a linefeed value of 1/8 inch.

```
10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,CHR$(27);"0";"1/8 INCHES LINE FEED"
40 FOR I=1 TO 6
50 PRINT #1,"LINE FEED";I;
60 PRINT #1,CHR$(10);
70 NEXT I
80 PRINT #1,"END";CHR$(10);
90 END
```

```
LINE FEED 1
LINE FEED 2
LINE FEED 3
LINE FEED 4
LINE FEED 5
LINE FEED 6
END
```

## 39. **[ESC 1]** (1B, 31)Hex (27, 49)Decimal

Input of this command designates a linefeed value of 7/72 inches.

```
10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,CHR$(27);"1";"7/72 INCHES LINE FEED"
40 FOR I=1 TO 6
50 PRINT #1,"LINE FEED";I;
60 PRINT #1,CHR$(10);
70 NEXT I
80 PRINT #1,"END";CHR$(10);
90 END
```

```
LINE FEED 1
LINE FEED 2
LINE FEED 3
LINE FEED 4
LINE FEED 5
LINE FEED 6
END
```

**40. [ESC] 2 (1B, 32)Hex (27, 50)Decimal**

Standard Mode: This code sets the linefeed pitch to 1/6 inch.

IBM Mode: The linefeed pitch specified by the [ESC] A n command is actually set when this code is input.

```
10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,CHR$(27);"2";
40 FOR I=1 TO 3
50 PRINT #1,"LINE FEED PITCH";I;CHR$(13);CHR$(10);
60 NEXT I
70 PRINT #1,CHR$(27);"A";CHR$(30);
80 PRINT #1,CHR$(27);"2";
90 FOR I=4 TO 6
100 PRINT #1,"LINE FEED PITCH";I;CHR$(13);CHR$(10);
110 NEXT I
```

```
LINE FEED PITCH 1
LINE FEED PITCH 2
LINE FEED PITCH 3
LINE FEED PITCH 4
LINE FEED PITCH 5
LINE FEED PITCH 6
```

```
10 'IBM MODE ( DIP-SW 1-5 ON )
20 OPEN "LPT1:" AS #1
30 WIDTH #1,255
40 PRINT #1,CHR$(27);"2";
50 FOR I=1 TO 3
60 PRINT #1,"LINE FEED PITCH";I;CHR$(13);CHR$(10);
70 NEXT I
80 PRINT #1,CHR$(27);"A";CHR$(30);
90 PRINT #1,CHR$(27);"2";
100 FOR I=4 TO 6
110 PRINT #1,"LINE FEED PITCH";I;CHR$(13);CHR$(10);
120 NEXT I
```

```
LINE FEED PITCH 1
LINE FEED PITCH 2
LINE FEED PITCH 3
LINE FEED PITCH 4
```

```
LINE FEED PITCH 5
```

```
LINE FEED PITCH 6
```

41. **ESC 3 n** (1B, 33, n)Hex (27, 51, n)Decimal  
 $0 \leq n \leq 255$

This code sets the linefeed pitch to  $n/144$  or  $n/216$  inch which is designated, respectively, by the **GS (01)** and **GS NUL** commands.  $n/216$  of an inch is the power-on default.

```
10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 FOR I=20 TO 100 STEP 20
40 PRINT #1,CHR$(27);"3";CHR$(I);
50 'LINE FEED LENGTH SETTING
60 PRINT #1,"VARIABLE LINE SPACING";CHR$(13);CHR$(10);
70 NEXT I
80 END
```

VARIABLE LINE SPACING

VARIABLE LINE SPACING

VARIABLE LINE SPACING

VARIABLE LINE SPACING

42. **ESC A n** (1B, 41, n)Hex (27, 65, n)Decimal  
 $0 \leq n \leq 85$

When  $n \geq 86$ , this code is ignored.

Standard Mode: This code sets the linefeed pitch to  $n/72$  inch.

IBM Mode: This code sets the linefeed pitch of  $n/72$  inch which will be valid when the **ESC 2** command is input. At power-on,  $n = 12$  (1/6 inch) is automatically selected.

```
10 'IBM MODE ( DIP-SW 1-5 ON )
20 OPEN "LPT1:" AS #1
30 WIDTH #1,255
40 FOR I=15 TO 60 STEP 15
50 PRINT #1,CHR$(27);"A";CHR$(I);
60 PRINT #1,CHR$(27);"2";
70 'LINE FEED LENGTH SETTING
80 PRINT #1,"VARIABLE LINE SPACING";CHR$(13);CHR$(10);
90 NEXT I
100 END
```

VARIABLE LINE SPACING  
 VARIABLE LINE SPACING

VARIABLE LINE SPACING

VARIABLE LINE SPACING

43. **GS (01)** (1D, 01)Hex (29, 1)Decimal

This code selects the linefeed pitch unit of 1/144 inch which will be used with the **ESC 3 n**, **ESC J n**, and **ESC j n** commands.

44. **GS (00)** (1D, 00)Hex (29, 0)Decimal

This code selects the linefeed pitch unit of 1/216 inch which is to be used with the **ESC 3 n**, **ESC J n**, and **ESC j n** commands.

```

10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 FOR I=20 TO 100 STEP 20
40 PRINT #1,CHR$(&H1D);CHR$(0);'SET n/216 INCHES
50 PRINT #1,CHR$(27);"3";CHR$(I);
60 'LINE FEED LENGTH SETTING
70 PRINT #1,"LINE FEED ";I;"/ 216";CHR$(13);CHR$(10);
80 NEXT I
90 FOR I=20 TO 100 STEP 20
100 PRINT #1,CHR$(&H1D);CHR$(1);'SET n/144 INCHES
110 PRINT #1,CHR$(27);"3";CHR$(I);
120 'LINE FEED LENGTH SETTING
130 PRINT #1,"LINE FEED ";I;"/ 144";CHR$(13);CHR$(10);
140 NEXT I
150 END

```

```

LINE FEED  20 / 216
LINE FEED  40 / 216
LINE FEED  60 / 216

```

```

LINE FEED  100 / 216

```

```

LINE FEED  20 / 144
LINE FEED  40 / 144

```

```

LINE FEED  60 / 144

```

```

LINE FEED  80 / 144

```

```

LINE FEED  100 / 144

```

## • Page Length

Skip-over perforation and vertical tab commands are cleared by these 2 commands.

45. **ESC C n** (1B, 43, n)Hex (27, 67, n)Decimal  
 $1 \leq n \leq 127$

Input of this command designates the page length in line units. n specifies the number of lines per page. The length of a page is determined by multiplying the current linefeed value to n.

The position of the paper, at the time this command is performed, is taken as the top of the form (TOF).

The page length is not altered even if the linefeed value is changed before the end of that page.

If  $n \geq 128$  or the page length exceeds 150 inches, the 3 bytes of this command are ignored.

```
10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,CHR$(27);"C";CHR$(5);
40 '5 LINES FOR PAGE LENGTH
50 PRINT #1,"START";CHR$(10);
60 PRINT #1,"PAGE 1";CHR$(10);
70 PRINT #1,CHR$(12);'FF CODE
80 PRINT #1,"PAGE 2";CHR$(10);
90 PRINT #1,CHR$(12);'FF CODE
100 PRINT #1,"PAGE 3";CHR$(10);
110 END
```

```
START
PAGE 1
```

```
PAGE 2
```

```
PAGE 3
```

46. 

ESC	C	(00) or (80)	n
-----	---	--------------	---

**(1B, 43, 00 or 80, n)Hex (27, 67, 0 or 128, n)Decimal** $1 \leq n \leq 22$ 

Input of this command designates the page length in inch units. n refers to the inch unit. If  $n \geq 23$  or  $n = 0$ , the 4 bytes of this command are ignored.

```

10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,CHR$(27);"C";CHR$(0);CHR$(1);
40 '1 INCHES FOR PAGE LENGTH
50 PRINT #1,"START";CHR$(10);
60 PRINT #1,"PAGE 1";CHR$(10);
70 PRINT #1,CHR$(12);'FF CODE
80 PRINT #1,"PAGE 2";CHR$(10);
90 PRINT #1,CHR$(12);'FF CODE
100 PRINT #1,"PAGE 3";CHR$(10);
110 END

```

```

START
PAGE 1

```

```

PAGE 2

```

```

PAGE 3

```



## • Horizontal Tab

### 47. | | | | | | | | |-----|---|----------------|----------------|-----|----------------|-----| | ESC | D | n <sub>1</sub> | n <sub>2</sub> | ... | n <sub>k</sub> | NUL | |-----|---|----------------|----------------|-----|----------------|-----|

(1B, 44, n<sub>1</sub>, n<sub>2</sub>, ..., n<sub>k</sub>, 00)Hex (27, 68, n<sub>1</sub>, n<sub>2</sub>, ..., n<sub>k</sub>, 0)Decimal

$1 \leq k \leq 32$  If  $k \geq 33$ , n<sub>k</sub> is ignored.

Input of this command designates the horizontal tab. The maximum number of horizontal tab settings is 32. At power-on, the horizontal tab is set at every 8th character column. This command alters these settings. The horizontal tabs are set in ascending order. The setting process ends with a 

NUL
-----

 code.

Standard Mode: n is a binary number that is multiplied to the present character width to set the absolute tab positions.

IBM Mode: Tab positions which are relative in this mode are based on the character width in effect when the 

HT
----

 command is used.

```
10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,CHR$(27);"M";
40 PRINT #1,"0123456789012345678901234567890123456789";CHR$(10);
50 PRINT #1,CHR$(27);"D";CHR$(5);CHR$(10);CHR$(20);
60 PRINT #1,CHR$(29);CHR$(0);"HORIZONTAL TAB"
70 PRINT #1,CHR$(27);"P";
80 FOR I=1 TO 4
90 PRINT #1,CHR$(9);"TAB";"MOVE TO TAB"
100 NEXT I
110 PRINT #1,CHR$(0)
120 END
```

```
0123456789012345678901234567890123456789
      TAB TAB      TAB      TAB
```

```
10 'IBM MODE (DIP SWITCH 1-5 ON)
20 OPEN "LPT1:" AS #1
30 WIDTH #1,255
40 PRINT #1,CHR$(27);"M";
50 PRINT #1,"0123456789012345678901234567890123456789";CHR$(10);
60 PRINT #1,CHR$(27);"D";CHR$(5);CHR$(10);CHR$(20);
70 PRINT #1,CHR$(29);CHR$(0);"HORIZONTAL TAB"
80 PRINT #1,CHR$(27);"P";
90 FOR I=1 TO 4
100 PRINT #1,CHR$(9);"TAB";"MOVE TO TAB"
110 NEXT I
120 PRINT #1,CHR$(0)
130 END
```

```
0123456789012345678901234567890123456789
      TAB TAB      TAB      TAB
```

**48. HT****(09) Hex (9) Decimal**

Data input following this command is printed from the next horizontal tab position.

```
10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,"012345678901234567890123456789";CHR$(10);
40 FOR I=1 TO 4
50 PRINT #1,CHR$(9);"TAB";GO TO DEFAULT TAB
60 NEXT I
70 PRINT #1,CHR$(13);
80 END
```

```
012345678901234567890123456789
      TAB      TAB      TAB      TAB
```

### ● Margin Setting

**49. ESC Q n****(1B, 51, n)Hex (27, 81, n)Decimal**

Input of this command designates the right margin. n specifies the column number according to the present character width. If the value of n exceeds the column number of a single line, the 3 bytes of this command are ignored.

Input of this command clears all print data input prior to this command.

```
10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,CHR$(27);"Q";CHR$(50);
40 RIGHT MARGIN AT 50TH COLUMN
50 FOR I=1 TO 3
60 FOR M=1 TO 8
70 PRINT #1,"0123456789";
80 NEXT M
90 PRINT #1,CHR$(13);CHR$(10);
100 NEXT I
110 END
```

```
01234567890123456789012345678901234567890123456789
012345678901234567890123456789
01234567890123456789012345678901234567890123456789
012345678901234567890123456789
01234567890123456789012345678901234567890123456789
012345678901234567890123456789
```

**50. ESC  $\ell$  n (1B, 6C, n)Hex (27, 108, n)Decimal**

Input of this command designates the left margin. n specifies the column number according to the present character width. If the value of n exceeds the column number of a single line, the 3 bytes of this command are ignored.

If the left margin setting exceeds the right margin setting, this command is ignored. This command is also ignored if the left margin is to be set at a position that exceeds 5.6 inches ( MP-1300 ) or 8.0 inches ( MP-5300 ) away from the left end of printable area.

```

10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,"012345678901234567890123456789";CHR$(10);
40 'LEFT MARGIN SETTING
50 PRINT #1,CHR$(27);"1";CHR$(10);'SET AT 10TH
60 PRINT #1,"LEFT MARGIN START LINE";CHR$(10);
70 PRINT #1,"LEFT MARGIN NO.2 LINE";CHR$(10);
80 PRINT #1,"LEFT MARGIN END LINE";CHR$(10);
90 PRINT #1,CHR$(27);"1";CHR$(0);'RESET LEFT MARGIN
100 PRINT #1,"START POSITION 0";CHR$(10);
110 END

```

```

012345678901234567890123456789
      LEFT MARGIN START LINE
      LEFT MARGIN NO.2 LINE
      LEFT MARGIN END LINE
START POSITION 0

```

**51. ESC X n1 n2 (1B, 58, n1, n2)Hex (27, 88, n1, n2)Decimal**

The left and right margins are set, respectively, to the n1 and n2 columns in the present character width. This command clears the print data already input.

The following are conditions for which the 4 bytes of this command are ignored.

- (i) If n1 and n2 do not conform to:  $1 \leq n1 < n2$ .
- (ii) If the left margin is set at a position beyond 5.6 inches away from the left end of printable area.
- (iii) If the right margin exceeds a single line.

```

10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,"012345678901234567890123456789";CHR$(10);
40 LEFT MARGIN SETTING
50 PRINT #1,CHR$(27);"X";CHR$(10);CHR$(14);
60 PRINT #1,"ABCDEFGH IJKLMNOPQRST";CHR$(10);
70 PRINT #1,CHR$(27);"X";CHR$(15);CHR$(24);
80 PRINT #1,"ABCDEFGH IJKLMNOPQRST";CHR$(10);
90 PRINT #1,CHR$(27);"X";CHR$(25);CHR$(39);
100 PRINT #1,"ABCDEFGH IJKLMNOPQRST";CHR$(10);
110 PRINT #1,CHR$(27);"1";CHR$(0);RESET LEFT MARGIN
120 PRINT #1,"START POSITION 0";CHR$(10);
130 END

```

```

012345678901234567890123456789
      ABCDE
      FGHIJ
      KLMNO
      PQRST
          ABCDEFGHIJ
          KLMNOPQRST
              ABCDEFGHIJKLMNOP
              PQRST
START POSITION 0

```

## • Underlining

### 52. **ESC - 1 or (01)** (1B, 2D, 31 or 01)Hex (27, 45, 49 or 1)Decimal

All characters are underlined, including spaces. An underline is not output when the printing position is moved due to a tab or when graphic data is printed.

### 53. **ESC - 0 or (00)** (1B, 2D, 30 or 00)Hex (27, 45, 48 or 0)Decimal

This command terminates underlining.

```
10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,CHR$(27);"-1";'UNDERLINE
40 PRINT #1,"ABC";
50 PRINT #1,CHR$(27);"-0";'CLEAR UNDERLINE
60 PRINT #1,"DEF";CHR$(13);CHR$(10);
70 PRINT #1,CHR$(27);"-1";'UNDERLINE
80 PRINT #1,"GHI";
90 PRINT #1,CHR$(9);'HORIZONTAL TAB
100 PRINT #1,"JKL";CHR$(13);CHR$(10);
110 END
```

```
ABCDEF
GHI JKL
```

## • Buffer Clear

### 54. **CAN** (18)Hex (24)Decimal

This command deletes the print data that has already been input. However, control functions are still valid.

```
10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,CHR$(27);"4";'ITALIC
40 PRINT #1,"ABCDEF";
50 PRINT #1,CHR$(24);'BUFFER CLEAR CODE
60 PRINT #1,"GHIJK";CHR$(13);CHR$(10);
70 END
```

```
GHIJK
```

## • Back Space

### 55. **[BS]** (08)Hex (8)Decimal

After printing the contents of the buffer, the printing initiation position is moved to the left by a single character width, allowing characters to be overlapped. This code is ignored in the Proportional Character mode.

```
10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,"THE DIAMOND I HAVE TO BUY ";
40 PRINT #1,"TO CALM MY WIFE COST ME Y";
50 PRINT #1,CHR$(8);"BACK SPACE"
60 PRINT #1,"=450,000.-";CHR$(13);CHR$(10);
70 END
```

THE DIAMOND I HAVE TO BUY TO CALM MY WIFE COST ME ¥450,000.-

## • Buzzer

### 56. **[BEL]** (07)Hex (7)Decimal

This command causes the buzzer to sound for approximately 1 second.

```
10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,CHR$(7);"SOUND BUZZER"
40 FOR I=1 TO 1000:NEXT I
50 PRINT #1,CHR$(7);"RING BUZZER"
60 END
```

## • Home Positioning

### 57. **[ESC][<]** (1B, 3C)Hex (27, 60)Decimal

This command moves the print head to the home position.

```
10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 FOR I=1 TO 3
40 PRINT #1,"ABC";CHR$(10);
50 NEXT I
60 PRINT #1,CHR$(27);"<";'HEAD TO HOME POSITION
70 FOR I=1 TO 3000:NEXT I
80 PRINT #1,"XYZ";CHR$(13);
90 END
```

```
ABC
ABC
ABC
XYZ
```

## • Skip-over Perforation

### 58. **[ESC][N][n]** (1B, 4E, n)Hex (27, 78, n)Decimal $1 \leq n \leq 127$

This command sets skip-over perforation linefeed mode.

n is set in line units. A form feed to the top of the next page is automatically performed when the number of remaining lines on the present page is n or less. If skip-over length exceeds the page length or if  $n = 0$  or  $n \geq 128$ , this code is ignored.

### 59. **[ESC][O]** (1B, 4F)Hex (27, 79)Decimal

This command terminates the skip-over perforation mode.

```
10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,CHR$(27);"C";CHR$(7);'7 LINES PAGE LENGTH
40 PRINT #1,CHR$(27);"N";CHR$(2);'2 LINES SKIPPED
50 FOR M=1 TO 2
60 FOR I= 1 TO 57
70 PRINT #1,I;CHR$(13);CHR$(10);
80 NEXT I
90 PRINT #1,CHR$(27);"O";'CANCEL SKIP-OVER PERFORATION
100 NEXT M
110 END
```

# CONTROL CODES

1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
49	
50	
51	
52	
53	
54	
55	
56	
57	
1	
2	
3	
4	
5	
6	
7	
8	
53	
54	
55	
56	
57	



## • Paper-out Detection

60. **ESC 8** (1B, 38)Hex (27, 56)Decimal

This command disables the paper-out detection switch.

61. **ESC 9** (1B, 39)Hex (27, 57)Decimal

This command enables the paper-out detection switch.

## • Reset

62. **ESC @** (1B, 40)Hex (27, 64)Decimal

This command puts the printer into the same state as the power-on state. All data input prior to this command is ignored. Refer to 'APPENDIX B' for more information.

```
10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,CHR$(27);"@ABCD";CHR$(10);
40 END
```

ABCD

## • Printing Direction

63. **ESC U 1 or (01)** (1B, 55, 31 or 01)Hex (27, 85, 49 or 1)Decimal

All print data that is input after this command is printed from left to right.

This command disables bidirectional printing to achieve greater precision on horizontal dot registration.

**64. ESC U 0 or (00) (1B, 55, 30 or 00)Hex (27, 85, 48 or 0)Decimal**

This command selects bidirectional printing.

```

10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,CHR$(27);"U";CHR$(0);"BIDIRECTIONAL"
40 PRINT #1,"----->";CHR$(13);CHR$(10);
50 PRINT #1,"<-----";CHR$(13);CHR$(10);
60 PRINT #1,CHR$(27);"U";CHR$(1);"UNIDIRECTIONAL"
70 PRINT #1,"----->";CHR$(13);CHR$(10);
80 PRINT #1,"----->";CHR$(13);CHR$(10);
90 END

```

```

----->
<-----
----->
----->

```

## • International Characters

**65. ESC R n (1B, 52, n)Hex (27, 82, n)Decimal**  
 $0 \leq n \leq 10$  n is binary number.

This command is valid only in Standard mode.

This command selects alternate international characters among 11 different language fonts. If  $n > 10$ , this command is ignored.

- n = 0: USA
- n = 1: France
- n = 2: Germany
- n = 3: England
- n = 4: Denmark
- n = 5: Sweden
- n = 6: Italy
- n = 7: Spain
- n = 8: Japan
- n = 9: Norway
- n = 10: Denmark II

## International Characters Designated by ESC, R, n Command

COUNTRY		U.S.A.	FRANCE	GERMANY	ENGLAND	DENMARK	SWEDEN	ITALY	SPAIN	JAPAN	NORWAY	DENMARK II
n		0	1	2	3	4	5	6	7	8	9	10
C O D E	(23) Hex	#	#	#	£	#	#	#	Pt	#	#	#
	(35) Decimal											
	(24) H	\$	\$	\$	\$	\$	☉	\$	\$	\$	☉	\$
	(36) D											
	(40) H	@	à	§	@	@	É	@	@	@	É	É
	(64) D											
	(5B) H	[	°	Ä	[	Æ	Ä	°	i	[	Æ	Æ
	(91) D											
	(5C) H	\	Ç	Ö	\	Ø	Ö	\	Ñ	¥	Ø	Ø
	(92) D											
	(5D) H	]	§	Ü	]	Å	Å	é	¿	]	Å	Å
	(93) D											
	(5E) H	^	^	^	^	^	Ü	^	^	^	Ü	Ü
	(94) D											
	(60) H	`	`	`	`	`	é	ù	`	`	é	é
	(96) D											
	(7B) H	{	é	ä	{	æ	ä	à	..	{	æ	æ
	(123) D											
	(7C) H		ù	ö		ø	ö	ò	ñ		ø	ø
	(124) D											
	(7D) H	}	è	ü	}	å	å	è	}	}	å	å
	(125) D											
	(7E) H	~	..	ß	~	~	ü	ì	~	~	ü	ü
	(126) D											

**Note:** The `[ESC] R n` command is valid only in Standard mode in which the Standard Character set is selected.

U.S.A. `# $ @ [ \ ] ^ _ { | } ~` FRANCE `# $ a ° ç s ~ ^ e u e ..` GERMANY `# $ $ A U U ~ ^ ~ a B U ß`

ENGLAND `# $ @ [ \ ] ^ _ { | } ~` DENMARK `# $ @ A O A ~ ^ ~ æ ø a ~` SWEDEN `# $ A O A U U e a B U a`

ITALY `# $ @ ° \ / é ~ ^ ü ä ö e i` SPAIN `R $ @ ; Ñ ¿ ~ ^ ~ ^ ~ ^ ~ ^ ~` JAPAN `# $ @ [ ¥ ] ^ ~ ^ { ( ) } ~`

NORWAY `# $ E A Ø A U U e s ø ø a u` DENMARK II `# $ $ E A Ø A U U e s ø ø a u`

## • Tab Initialization

### 66. **ESC R** (1B, 52) Hex (27, 82) Decimal

This command is valid only in IBM mode.

All vertical and horizontal tab settings are cancelled and replaced with the power-on default settings.

## • Deleting Data

### 67. **DEL** (7F or FF) Hex (127 or 255) Decimal

This command is valid only in Standard mode.

The previous character in the buffer is deleted.

This command is ignored in the Proportional Character mode.

```
10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,"HHHX";
40 PRINT #1,CHR$(127);"DELETE CODE"
50 PRINT #1,"HHH";CHR$(13);
60 END
```

HHHHHH

## • Vertical Tab

### 68. **ESC B n1 n2 ... nk NUL**

(1B, 42, n1, n2, ..., nk, 00) Hex (27, 66, n1, n2, ..., nk, 0) Decimal

$1 \leq n \leq 255$ ,  $1 \leq k \leq 16$  (Standard mode) or 64 (IBM mode)

This command selects vertical tab positions in channel 0.

$n$  selects the number of lines. The vertical tab is positioned by multiplying the present single linefeed setting by the number of lines ( $n$ ). The vertical tabs are set in ascending order. The code sequence ends with the **NUL** code. If the order is reversed, this command is terminated. The **VT** command is used to move to vertical tab positions. The **ESC B NUL** command clears all vertical tabs in channel 0, so that the **VT** command will be identical to the **CR** command.

69. `ESC b m n1 n2 ... nk NUL`

(1B, 62, m, n1, n2, ..., nk, 00)Hex (27, 98, m, n1, n2, ..., nk, 0)Decimal

 $0 \leq m \leq 7, 1 \leq n \leq 255, 1 \leq k \leq 16$ 

This command is valid only in Standard mode.

This command allows up to 16 vertical tabs to be set in one of the 8 tab channels. There are 8 channels within which vertical tabs can be independently set. m specifies the channel. When m = 0, this command becomes the same as the `ESC B` command. The method of setting is the same as the `ESC B` command.

The `ESC b m NUL` command clears all vertical tabs in channel m, so that the `VT` command becomes the `CR` command.

70. `ESC / m`

(1B, 2F, m)Hex (27, 47, m)Decimal

 $(0 \leq m \leq 7)$ 

This command is valid only in Standard mode.

This command selects the vertical tab channel to be used. When m = 0, the vertical tabs set by `ESC B` are used.

The `VT` command is used to move to vertical tab positions.

Channel 0 (m = 0) is automatically selected at power-on (the default value).

```

10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,CHR$(27);"b";CHR$(1);CHR$(15);CHR$(35);CHR$(1);
40 'SET TABS AT 15,35 FOR CHANNEL 1
50 PRINT #1,CHR$(27);"b";CHR$(2);CHR$(20);CHR$(25);CHR$(1);
60 'SET TABS AT 20,25 FOR CHANNEL 2
70 PRINT #1,CHR$(27);"b";CHR$(3);CHR$(20);CHR$(45);CHR$(1);
80 'SET TABS AT 20,45 FOR CHANNEL 3
90 'START OF MAIN PROGRAM
100 FOR I=1 TO 3 : READ X
110 PRINT #1,"TOP OF FORM";CHR$(10);
120 PRINT #1,CHR$(27);"/";CHR$(X);
130 'SET CURRENT CHANNEL "PAGE"
140 PRINT #1,CHR$(11);"TAB 1 FOR CHANNEL"X
150 PRINT #1,CHR$(11);"TAB 2 FOR CHANNEL"X
160 PRINT #1,CHR$(140);
170 NEXT I
180 DATA 1,2,3
190 PRINT #1,CHR$(27);"@";
200 END

```

# CONTROL CODES

TOP OF FORM	TOP OF FORM	TOP OF FORM
TAB 1 FOR CHANNEL 1	TAB 1 FOR CHANNEL 2	TAB 1 FOR CHANNEL 3
TAB 2 FOR CHANNEL 1	TAB 2 FOR CHANNEL 2	TAB 2 FOR CHANNEL 3

## • Printer Selection

### 71. **DC3** (13)Hex (19)Decimal

This command puts the printer in the deselected state in which the printer ignores all input data except the **DC1** code.

### 72. **DC1** (11)Hex (17)Decimal

Input of this command terminates the **DC3** command.

```
10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,"STANDARD PICA 1";CHR$(10);
40 PRINT #1,CHR$(19);"SET THE DESELECT STATE
50 PRINT #1,CHR$(27);"M";"ELITE CHARACTER
60 PRINT #1,"ELITE CHARACTER";CHR$(10);
70 PRINT #1,CHR$(17);"DESELECT STATE TERMINATES
80 PRINT #1,"STANDARD PICA 2";CHR$(10);
90 END
```

```
STANDARD PICA 1
STANDARD PICA 2
```

## • Download Characters (User-defined characters)

Special Draft characters defined by an user are called Download characters. The commands explained here are valid only in Standard mode. Thus, DIP switch 1-5 must be turned off and DIP switch 1-6 must be turned on before applying power to the printer.

A maximum of 256 download characters can be defined and stored in the RAM area. The contents of the RAM are lost if the power is turned off.

To use the download characters, switch from the default normal character set in the ROM to the download character set in the RAM by inputting the **ESC % (01) n** command.

73. 

ESC	%	(00)	(00)
-----	---	------	------

 (1B, 25, 00, 00)Hex (27, 37, 0, 0)Decimal

This command selects the normal character set stored in the ROM which cannot be modified.

At power-on, this character set is automatically selected.

74. 

ESC	%	(01)	(00)
-----	---	------	------

 (1B, 25, 01, 00)Hex (27, 37, 1, 0)Decimal

This command selects the download character set stored in the RAM which can be accessed.

At power-on, no character is written into the RAM area for the download character set.

The 

ESC	&
-----	---

 command is used to write download characters into the RAM area.

75. 

ESC	:	(00)	(00)	(00)
-----	---	------	------	------

 (1B, 3A, 00, 00, 00)Hex (27, 58, 0, 0, 0)Decimal

This command copies the download characters from the ROM characters. Specific characters can then be changed, while leaving the remaining characters unchanged.



76. 

ESC	&	(00)	n	m	a	C <sub>0</sub>	C <sub>1</sub>	...	C <sub>10</sub>
-----	---	------	---	---	---	----------------	----------------	-----	-----------------

(1B, 26, 00, n, m, a, C<sub>0</sub>, C<sub>1</sub>, ..., C<sub>10</sub>)Hex

(27, 38, 0, n, m, a, C<sub>0</sub>, C<sub>1</sub>, ..., C<sub>10</sub>)Decimal

This command defines download characters whose codes are in the range of (00)Hex through (FF)Hex.

n is the first download character code to be written and m is the last one. If n is equal to m, only one character is to be written. a (attribute) defines descender and proportional information for the download character to be written.

The following 11 bytes (C<sub>0</sub> ~ C<sub>10</sub>) are the data that actually define the character. Since this command is valid only in Standard mode, be sure DIP switch 1-5 is off and DIP switch 1-6 is on before applying power to the printer. When the download character mode is selected, the space within the communication buffer is decreased from 10K bytes to 7K bytes (MP-1300) or from 6K bytes to 3K bytes (MP-5300).

**Note:** Since international characters are assigned to code (00)Hex to (1F)Hex, (7F)Hex to (9F)Hex, and (FF)Hex, as shown in the table below, international characters will be changed accordingly if they are defined as download characters.

A	a	B	b	C	c	D	d	E	e	F	f
B	o	o	o	P	p	A	A	E	E	F	F
C	P	P	P	B	B	C	C	D	D	E	E
D	A	A	A	E	E	F	F	F	F	F	F
E	E	E	E	F	F	F	F	F	F	F	F
F	F	F	F	F	F	F	F	F	F	F	F

Example: When English is selected and a given character is defined for the (00)Hex code, the input of (23)Hex code will print the defined character instead of

Refer to the International character table shown in the ESC R n command on page 101.

## International character's code assignment

L \ H	0	1	7	8	9	F
0	à	§		à	§	
1	è	ß		è	ß	
2	ù	Æ		ù	Æ	
3	ò	æ		ò	æ	
4	ì	Ø		ì	Ø	
5	°	ø		°	ø	
6	£	..		£	..	
7	ï	Ä		ï	Ä	
8	í	Ö		í	Ö	
9	Ñ	Ü		Ñ	Ü	
A	ñ	ä		ñ	ä	
B	⊗	ö		⊗	ö	
C	Pt	ü		Pt	ü	
D	Å	É		Å	É	
E	å	é		å	é	
F	ç	¥	0	ç	¥	0

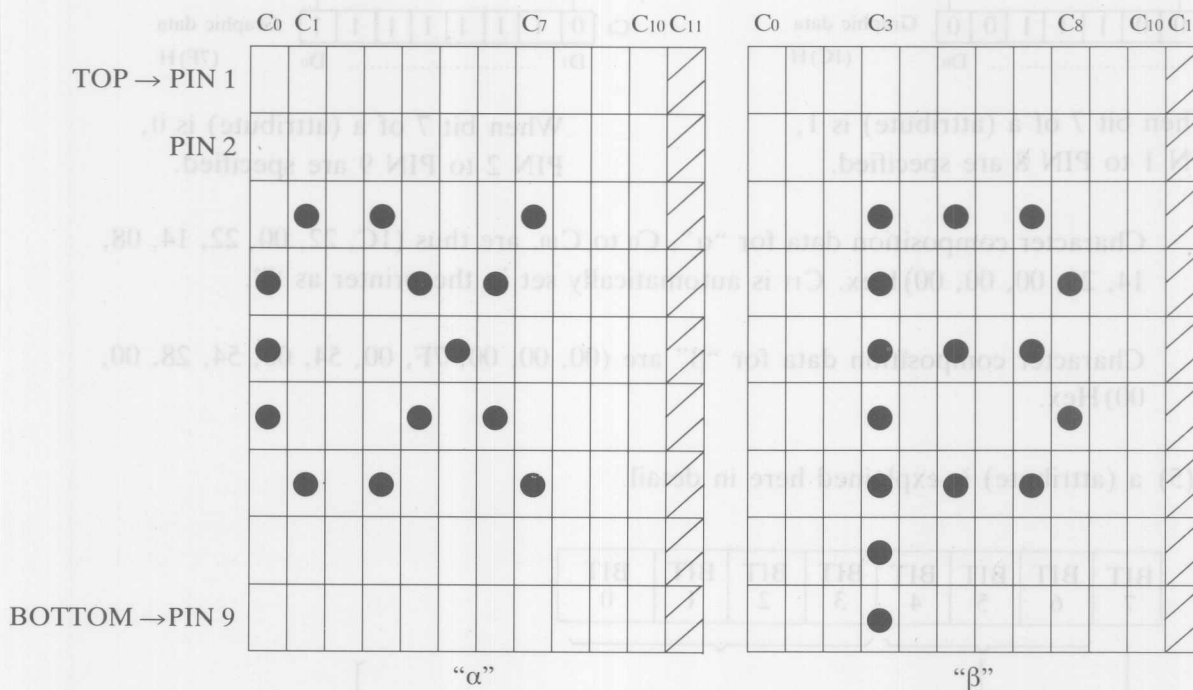
(80)Hex ~ (9F)Hex and  
(FF)Hex are Italics.

**Example:** When England is selected and a given character is defined for the (06)Hex code, the input of (23)Hex code will print the defined character instead of “£”.

Refer to the International character table shown in the `ESC[Rn` command on page 101.

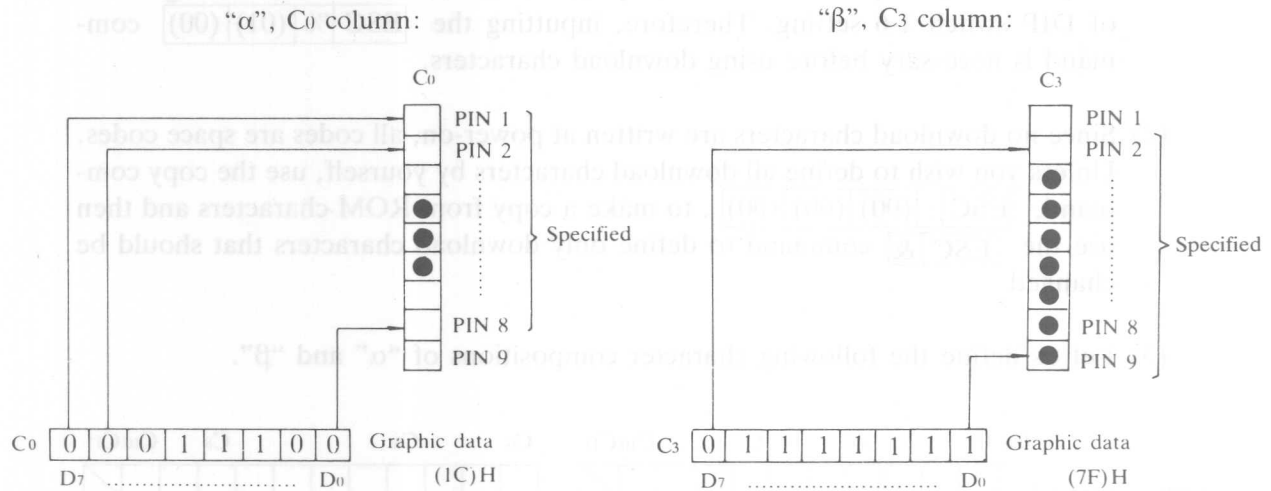
**Example of defining characters “α” and “β”, respectively, for codes (41) Hex and (42) Hex.**

- (1) At power-on, the printer automatically selects the ROM character set regardless of DIP switch 1-6 setting. Therefore, inputting the `ESC % (01) (00)` command is necessary before using download characters.
- (2) Since no download characters are written at power-on, all codes are space codes. Unless you wish to define all download characters by yourself, use the copy command, `ESC : (00) (00) (00)`, to make a copy from ROM characters and then use the `ESC &` command to define only download characters that should be changed.
- (3) Let us define the following character compositions of “α” and “β”.



**Note:** Horizontally aligned dots are not printed. Refer to the `ESC Y n1 n2` command.

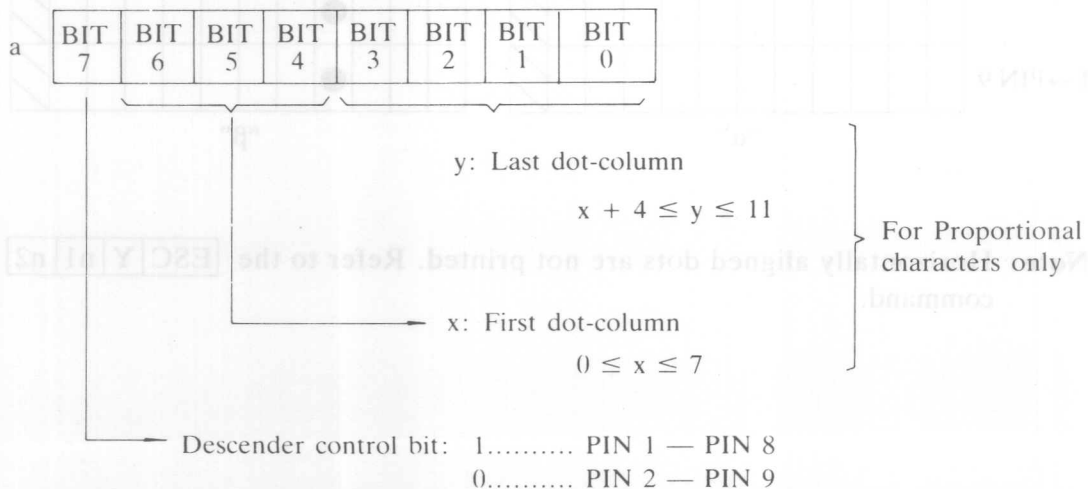
(4) The relationship between PIN 1 to PIN 9 and graphic data is as follows.

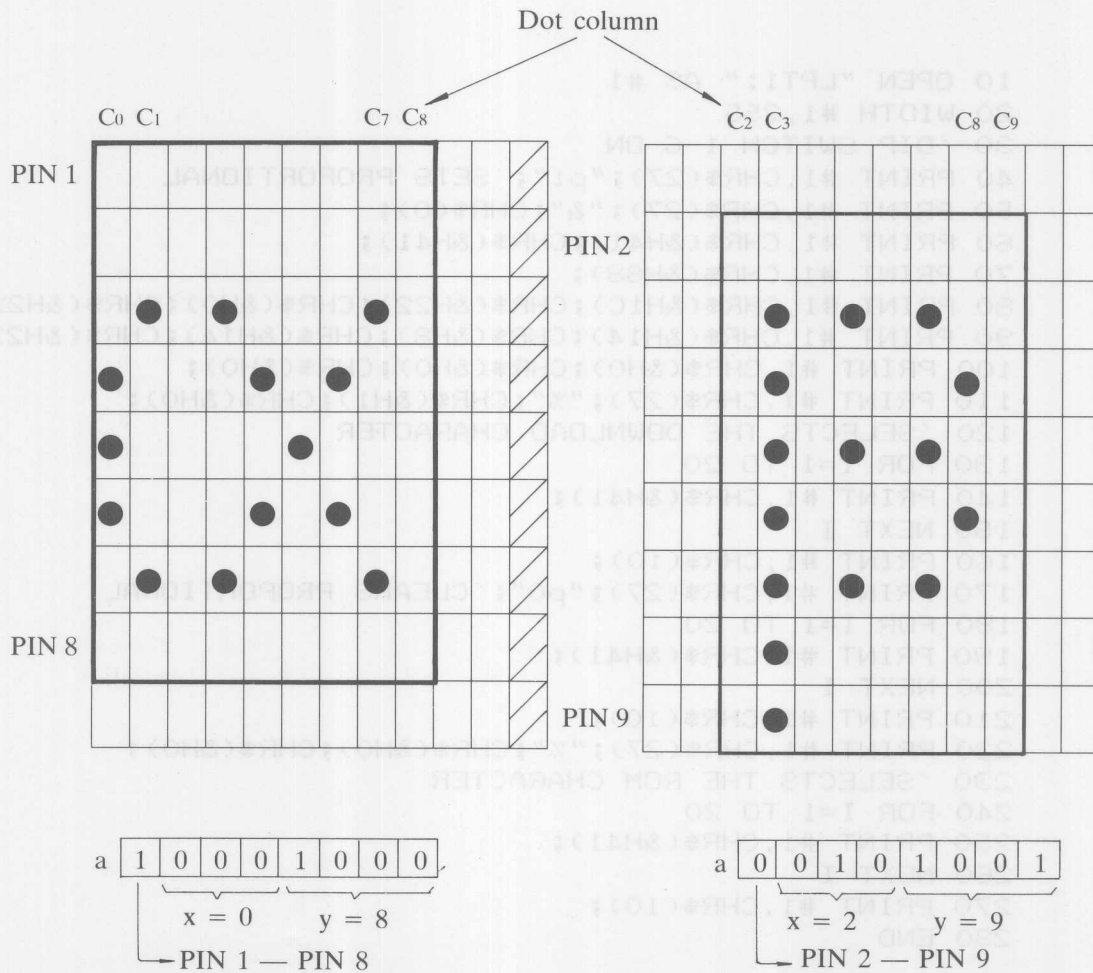


Character composition data for “α”, C<sub>0</sub> to C<sub>10</sub>, are thus (1C, 22, 00, 22, 14, 08, 14, 22, 00, 00, 00)Hex. C<sub>11</sub> is automatically set in the printer as ‘0’.

Character composition data for “β” are (00, 00, 00, 7F, 00, 54, 00, 54, 28, 00, 00)Hex.

(5) a (attribute) is explained here in detail.



**Example:**

With the above character compositions, “ $\alpha$ ” for code (41)Hex and “ $\beta$ ” for code (42)Hex can be defined as follows.

“ $\alpha$ ”	ESC, &, 00, n, m	1B, 26, 00, 41, 42
	a	88,
“ $\beta$ ”	C0, C1, C2, C3, C4, C5,	1C, 22, 00, 22, 14, 08
	C6, C7, C8, C9, C10,	14, 22, 00, 00, 00,
	a	29,
	C0, C1, C2, C3, C4, C5,	00, 00, 00, 7F, 00, 54
	C6, C7, C8, C9, C10,	00, 54, 28, 00, 00

## (6) Example 1

```

10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 'DIP SWITCH 1-6 ON
40 PRINT #1,CHR$(27);"p1";'SETS PROPORTIONAL
50 PRINT #1,CHR$(27);"&";CHR$(0);
60 PRINT #1,CHR$(&H41);CHR$(&H41);
70 PRINT #1,CHR$(&H88);
80 PRINT #1,CHR$(&H1C);CHR$(&H22);CHR$(&H0);CHR$(&H22);
90 PRINT #1,CHR$(&H14);CHR$(&H8);CHR$(&H14);CHR$(&H22);
100 PRINT #1,CHR$(&H0);CHR$(&H0);CHR$(&H0);
110 PRINT #1,CHR$(27);"%" ;CHR$(&H1);CHR$(&H0);
120 'SELECTS THE DOWNLOAD CHARACTER
130 FOR I=1 TO 20
140 PRINT #1,CHR$(&H41);
150 NEXT I
160 PRINT #1,CHR$(10);
170 PRINT #1,CHR$(27);"p0";'CLEARS PROPORTIONAL
180 FOR I=1 TO 20
190 PRINT #1,CHR$(&H41);
200 NEXT I
210 PRINT #1,CHR$(10);
220 PRINT #1,CHR$(27);"%" ;CHR$(&H0);CHR$(&H0);
230 'SELECTS THE ROM CHARACTER
240 FOR I=1 TO 20
250 PRINT #1,CHR$(&H41);
260 NEXT I
270 PRINT #1,CHR$(10);
280 END

```

```

xxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxx
AAAAAAAAAAAAAAAAAAAAAA

```

## (7) Example 2

```

10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 'DIP SWITCH 1-6 ON
40 PRINT #1,CHR$(27);"p1"; 'SETS PROPORTIONAL
50 PRINT #1,CHR$(27);"&";CHR$(0);
60 PRINT #1,CHR$(&H41);CHR$(&H42);
70 PRINT #1,CHR$(&H88);
80 PRINT #1,CHR$(&H1C);CHR$(&H22);CHR$(&H0);CHR$(&H22);
90 PRINT #1,CHR$(&H14);CHR$(&H8);CHR$(&H14);CHR$(&H22);
100 PRINT #1,CHR$(&H0);CHR$(&H0);CHR$(&H0);
110 PRINT #1,CHR$(&H29);
120 PRINT #1,CHR$(&H0);CHR$(&H0);CHR$(&H0);CHR$(&H7F);
130 PRINT #1,CHR$(&H0);CHR$(&H54);CHR$(&H0);CHR$(&H54);
140 PRINT #1,CHR$(&H28);CHR$(&H0);CHR$(&H0);
150 PRINT #1,CHR$(27);"%" ;CHR$(&H1);CHR$(&H0);
160 'SELECTS THE DOWNLOAD CHARACTER
170 FOR I=1 TO 20
180 PRINT #1,CHR$(&H41);
190 NEXT I
200 PRINT #1,CHR$(10);
210 FOR I=1 TO 20
220 PRINT #1,CHR$(&H42);
230 NEXT I
240 PRINT #1,CHR$(10);
250 PRINT #1,CHR$(27);"p0"; 'CLEARS PROPORTIONAL
260 FOR I=1 TO 20
270 PRINT #1,CHR$(&H41);
280 NEXT I
290 PRINT #1,CHR$(10);
300 FOR I=1 TO 20
310 PRINT #1,CHR$(&H42);
320 NEXT I
330 PRINT #1,CHR$(10);
340 PRINT #1,CHR$(27);"%" ;CHR$(&H0);CHR$(&H0);
350 'SELECTS THE ROM CHARACTER
360 FOR I=1 TO 20
370 PRINT #1,CHR$(&H41);
380 NEXT I
390 PRINT #1,CHR$(10);
400 FOR I=1 TO 20
410 PRINT #1,CHR$(&H42);
420 NEXT I
430 PRINT #1,CHR$(10);
440 END

```

```

xxxxxxxxxxxxxxxxxxxxxx
pppppppppppppppppppp
xxxxxxxxxxxxxxxxxxxxxx
pppppppppppppppppppp
AAAAAAAAAAAAAAAAAAAAAA
BBBBBBBBBBBBBBBBBBBB

```

## • Input Data Control

The following 3 commands are valid only in Standard mode.

### 77. **ESC=** (1B, 3D) Hex (27, 61) Decimal

Input of this command causes the 8th bit (MSB) of incoming data to be handled as if it were a '0' in the printer. Some computers always send data with the 8th bit set to 1. Input data cannot be greater than 127 after this command is input.

```
10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,CHR$(27);"=";" 8TH BIT 0
40 FOR I=32 TO 80
50 PRINT #1,CHR$(I);
60 NEXT I
70 PRINT #1,CHR$(13);CHR$(10);
80 FOR I=160 TO 208
90 PRINT #1,CHR$(I);
100 NEXT I
110 PRINT #1,CHR$(13);
120 END
```

```
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPO
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNPO
```



78. **ESC** **>**

(1B, 3E) Hex (27, 62) Decimal

Input of this command causes the 8th bit (MSB) of incoming data to be handled as if it were a '1' in the printer. In most cases this causes text to be printed as italics. Input data cannot be smaller than 128 after this command is input.

```
10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,CHR$(27);">";'8TH BIT 1
40 FOR I=32 TO 80
50 PRINT #1,CHR$(I);
60 NEXT I
70 PRINT #1,CHR$(13);CHR$(10);
80 FOR I=160 TO 208
90 PRINT #1,CHR$(I);
100 NEXT I
110 PRINT #1,CHR$(13);
120 END
```

```
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN
```

79. **ESC** **#**

(1B, 23) Hex (27, 35) Decimal

8th bit control set by the **ESC** **=** or **ESC** **>** command is cleared. At power-on, this mode is selected.

```
10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,CHR$(27);"#";'8 BIT DATA HOLDING
40 FOR I=32 TO 80
50 PRINT #1,CHR$(I);
60 NEXT I
70 PRINT #1,CHR$(13);CHR$(10);
80 FOR I=160 TO 208
90 PRINT #1,CHR$(I);
100 NEXT I
110 PRINT #1,CHR$(13);
120 END
```

```
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN
```

## • Print Code Area Designation

80. **ESC 6** (1B, 36) Hex (27, 54) Decimal

i) In Standard mode:

This command allows codes (80)Hex to (9F)Hex and (FF)Hex to be printed as characters and symbols in italics. Compare the table below with the Standard Character Set Table.

Upper Lower	8	9	F
0	à	§	
1	è	β	
2	ù	Æ	
3	ò	æ	
4	ì	Ø	
5	ó	ø	
6	£	ˆ	
7	ı	Ä	
8	ı	Ö	
9	Ñ	Ü	
A	ñ	ä	
B	☉	ö	
C	Pt	ü	
D	Å	É	
E	å	é	
F	ç	¥	0

```

10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT CODE AREA DESIGNATION
40 PRINT #1,CHR$(27);"Q";
50 PRINT #1,CHR$(20);
60 RIGHT MARGIN 20
70 PRINT #1,CHR$(27);"x1";
80 PRINT #1,CHR$(27);"6";
90 FOR I=&H80 TO &H9F
100 PRINT #1,CHR$(I);
110 NEXT I
120 FOR I=&HFO TO &HFF
130 PRINT #1,CHR$(I);
140 NEXT I
150 PRINT #1,CHR$(10);
160 END

```

àèùðì°£ı;ÄNñµRAÄÇSßÆø  
 Øø"ÅÜÜÄÜÜÉÉ¥pqrstuvw  
 xyz{ }~0

ii) In IBM Mode:

This command selects the IBM Character Set 2.

**81. ESC 7 (1B, 37)Hex (27, 55)Decimal****i) In Standard Mode:**

This command terminates the ESC 6 command.

After input of this command, codes (80)Hex to (9F)Hex and (FF)Hex return to control codes.

**ii) In IBM Mode:**

This command selects the IBM Character Set 1.

**82. ESC I 1 or (01) (1B, 49, 31 or 01)Hex (27, 73, 49 or 1)Decimal**

Input of this command designates print characters in the range of (00)Hex to (1F)Hex and (80)Hex to (9F)Hex excluding the control codes as shown on the next page.

```

10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,CHR$(27);"I";CHR$(1);
40 FOR I=&H0 TO &H6
50 PRINT #1,CHR$(I);
60 NEXT I
70 FOR I=&H10 TO &H11
80 PRINT #1,CHR$(I);
90 NEXT I
100 FOR I=&H15 TO &H17
110 PRINT #1,CHR$(I);
120 NEXT I
130 FOR I=&H1C TO &H1F
140 PRINT #1,CHR$(I);
150 NEXT I
160 PRINT #1,CHR$(10);
170 PRINT #1,CHR$(27);"I";CHR$(0);
180 END

```

àèùòì°£§ø"ÀÜëé¥

**83. ESC I 0 or (00) (1B, 49, 30 or 00) Hex (27, 73, 48 or 0) Decimal**

Input of this command terminates the ESC I 1 command.

This mode is set when power is turned on.

Upper Lower	0 (8)	1 (9)
0	à	§
1	è	β
2	ù	DC2
3	ò	DC3
4	ì	DC4
5	°	ø
6	£	..
7	BEL	Ä
8	BS	CAN
9	HT	EM
A	LF	ä
B	VT	ESC
C	FF	ü
D	CR	É
E	SO	é
F	SI	¥

Control codes and print characters  
after ESC I 1 is input.

Upper Lower	0 (8)	1 (9)
0		
1		DC1
2		DC2
3		DC3
4		DC4
5		
6		
7	BEL	
8	BS	CAN
9	HT	EM
A	LF	
B	VT	ESC
C	FF	
D	CR	GS
E	SO	
F	SI	

Control codes  
after ESC I 0 is input.

**Note;** Print characters in the range of (80)Hex to (9F)Hex are printed in Italics.

Refer to 82.

## • Immediate Printing

84. **ESC i 1 or (01)** (1B, 69, 31 or 01) Hex (27, 105, 49 or 1) Decimal

This command designates the immediate print mode in which print data that is already input will be printed if the next data is not input within 0.2 second.

85. **ESC i 0 or (00)** (1B, 69, 30 or 00) Hex (27, 105, 48 or 0) Decimal

This command terminates the immediate print mode.

```

10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 'SET THE IMMEDIATE PRINT MODE
40 PRINT #1,CHR$(27);"i";CHR$(1);
50 PRINT #1,"Lisa ";
60 FOR I=1 TO 4000:NEXT I
70 PRINT #1,"is ";
80 FOR I=1 TO 4000:NEXT I
90 PRINT #1,"beautiful.";
100 PRINT #1,CHR$(10);
110 'CLEAR THE IMMEDIATE PRINT MODE
120 PRINT #1,CHR$(27);"i";CHR$(0);
130 PRINT #1,"Lisa ";
140 FOR I=1 TO 4000:NEXT I
150 PRINT #1,"is ";
160 FOR I=1 TO 4000:NEXT I
170 PRINT #1,"beautiful.";
180 PRINT #1,CHR$(10);
190 END

```

Lisa is beautiful.  
Lisa is beautiful.

```

10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,CHR$(27);"i";CHR$(1);
40 'IMMEDIATE PRINT MODE SET FOR 80 CHARACTER
50 FOR I= 1 TO 80
60 A$=INKEY$
70 IF A$="" GOTO 60
80 PRINT #1,A$;
90 NEXT
100 'CLEAR THE IMMEDIATE PRINT MODE
110 PRINT #1,CHR$(27);"i";CHR$(0);
120 END

```

ABCDEFGHIJKLMNOPQRSTUVWXYZ  
abcdefghijklmnopqrstuvwxyz  
0123456789

## • CSF Control

Use these commands only when the optional Cut Sheet Feeder is installed.

### 86. **ESC EM 4** (1B, 19, 34) Hex (27, 25, 52) Decimal

Input of this command designates the CSF mode.

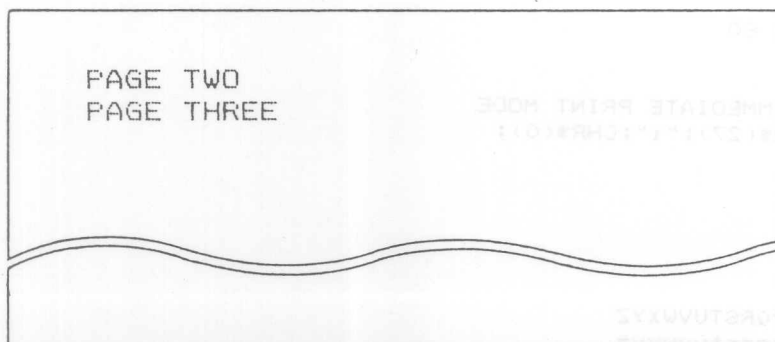
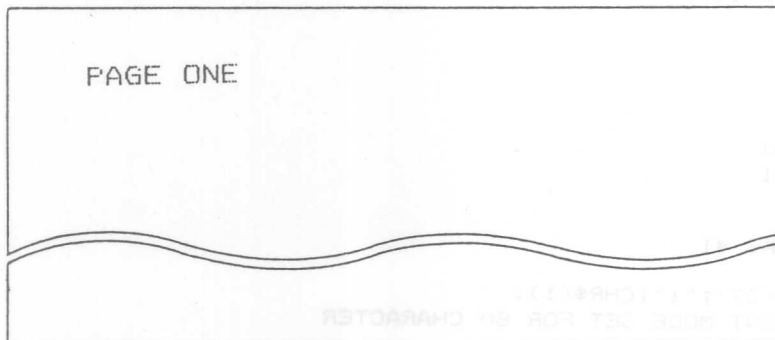
The CSF mode **MUST** be entered to make most use of the CSF.

If DIP switch 2-1 is set to the ON position at power-on, the printer enters the CSF mode.

```

10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 ' C.S.F. MODE DESIGNATION
40 PRINT #1,CHR$(27);CHR$(25);"4";
50 PRINT #1,"PAGE ONE";CHR$(10);
60 ' PAPER EJECTION
70 PRINT #1,CHR$(27);CHR$(25);"R";
80 PRINT #1,"PAGE TWO";CHR$(10);
90 ' C.S.F. MODE TERMINATION
100 PRINT #1,CHR$(27);CHR$(25);"O";
110 ' PAPER EJECTION IS NOT PERFORMED
120 PRINT #1,CHR$(27);CHR$(25);"R";
130 PRINT #1,"PAGE THREE";CHR$(10);

```



87. **ESC EM 0** (1B, 19, 30) Hex (27, 25, 48) Decimal

This command terminates the CSF mode.

88. **ESC EM R** (1B, 19, 52) Hex (27, 25, 82) Decimal

Input of this command ejects a cut sheet in the CSF mode.

Refer to the "THE OPTIONAL CUT SHEET FEEDER" for further information.

## • CR Code Control

These 2 commands are valid only in IBM Mode.

89. **ESC 5 1 or (01)** (1B, 35, 31 or 01) Hex (27, 53, 49 or 1) Decimal

The **CR** code performs a carriage return and linefeed regardless of the AUTO FEED signal and DIP switch 1-7 selection.

```

10 IBM MODE (DIP SWITCH 1-5 ON)
20 OPEN "LPT1:" AS #1
30 WIDTH #1,255
40 PRINT #1,CHR$(27);"5";CHR$(1);
50 PRINT #1,"ABCDEF";CHR$(13);
60 PRINT #1,"      GHIJKL";
70 PRINT #1,CHR$(10);CHR$(10);
80 PRINT #1,CHR$(27);"5";CHR$(0);
90 PRINT #1,"ABCDEF";CHR$(13);
100 PRINT #1,"      GHIJKL";CHR$(10);
110 END

```

```

ABCDEF
      GHIJKL

```

```

ABCDEFGHIJKL

```

90. **ESC 5 0 or (00)** (1B, 35, 30 or 00)Hex (27, 53, 48 or 0)Decimal

The **CR** code performs a carriage return without linefeed regardless of the **AUTO FEED** signal and DIP switch 1-7 selection.

Refer to 89.

### • Print Position Control

91. **ESC SP n** (1B, 20 n)Hex (27, 32, n)Decimal  
 $0 \leq n \leq 127$

The space between characters is increased by n dot columns in the dot pitch units of the current print mode. Each dot pitch is shown below.

	Print Mode	Dot pitch
Draft	Pica 10 cpi	n/120"
	Elite 12 cpi	n/144"
	Condensed 17 cpi	n/240"
	Condensed Elite 20 cpi	n/240"
NLQ	Pica 10 cpi	n/240"
	Elite 12 cpi	n/288"

```

10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,"ABCDEF";
40 PRINT #1,CHR$(27);CHR$(32);CHR$(60);
50 PRINT #1,"GHIJKL";CHR$(10);
60 PRINT #1,CHR$(27);CHR$(32);CHR$(0);
70 PRINT #1,CHR$(15);"CONDENSED"
80 PRINT #1,"ABCDEF";
90 PRINT #1,CHR$(27);CHR$(32);CHR$(60);
100 PRINT #1,"GHIJKL";CHR$(10);
110 PRINT #1,CHR$(18);"CLEAR CONDENSED"
120 PRINT #1,CHR$(27);CHR$(32);CHR$(0);
130 END

```

```

ABCDEF G      H      I      J      K      L
ABCDEF G  H    I    J    K    L

```



92. **ESC** **\$** **n1** **n2**

(1B, 24, n1, n2) Hex (27, 36, n1, n2) Decimal

This command moves the print head to an absolute dot position. The dot position is calculated by  $(256 \times n2 + n1) \times 1/60$  inch.

This command is ignored if the calculated dot position exceeds the right margin.

```

10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,"ABCDEF";
40 PRINT #1,CHR$(27);"$";CHR$(60);CHR$(0);
50 PRINT #1,"GHIJKL";CHR$(10);
60 PRINT #1,CHR$(15);"CONDENSED
70 PRINT #1,"ABCDEF";
80 PRINT #1,CHR$(27);"$";CHR$(60);CHR$(0);
90 PRINT #1,"GHIJKL";CHR$(10);
100 PRINT #1,CHR$(18);"CLEAR CONDENSED
110 END

```

```

ABCDEF  GHIJKL
ABCDEF  GHIJKL

```

93. **ESC** **\** **n1** **n2**

(1B, 5C, n1, n2) Hex (27, 92, n1, n2) Decimal

The print head can be moved to a dot position relative to the present position. The dot pitch is the same as the **ESC** **SP** **n** command.

The amount of movement to the right in dot units is calculated by  $(256 \times n2 + n1)$ .

This command is ignored if the calculated dot position is outside the current left and right margins.

```

10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,"ABCDEF";
40 PRINT #1,CHR$(27);"\";CHR$(20);CHR$(0);
50 PRINT #1,"GHIJKL";CHR$(10);
60 PRINT #1,CHR$(15);"CONDENSED
70 PRINT #1,"ABCDEF";
80 PRINT #1,CHR$(27);"\";CHR$(20);CHR$(0);
90 PRINT #1,"GHIJKL";CHR$(10);
100 PRINT #1,CHR$(18);"CLEAR CONDENSED
110 END

```

```

ABCDEF  GHIJKL
ABCDEF  GHIJKL

```

## — USING THE OPTIONAL CUT SHEET FEEDER —

### • Introduction to Using the CSF

Follow the procedure below to use the CSF for the first time.

1. Install the CSF in the printer according to the instructions shown in the CSF owner's manual.
2. Connect the printer to your computer with a cable.
3. Turn the paperfeed knob of the printer to have the red mark appear in the home position indicator of the CSF.
4. Shuffle cut sheets and set them in the hopper of the CSF.
5. Apply power to the printer after moving DIP switch 2-1 to the ON position to enter the CSF mode.

**NOTE:** The CSF mode **MUST** be entered to make most use of the CSF.

6. Apply power to your computer.

The BASIC program listed below is for the IBM-PC.

If you are not familiar with BASIC program commands such as PRINT #1 and LIST, consult your IBM BASIC reference documentations for details.

7. Type the program below and run it:

```
10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,"LINE 1";CHR$(10);
40 PRINT #1,"LINE 2";CHR$(10);
50 PRINT #1,"LINE 3";CHR$(10);
60 ' PAPER EJECTION
70 PRINT #1,CHR$(27);CHR$(25);CHR$(82);
```

Function	Symbol	Hex code	Decimal code
CSP mode designation	ESC EM 4	(1B, 19, 34)H	(27, 25, 52)D
CSP mode termination	ESC EM 0	(1B, 19, 30)H	(27, 25, 48)D
Paper ejection (in CSP mode)	ESC EM R	(1B, 19, 52)H	(27, 25, 82)D

Line 10 and 20 are necessary for a program to output data to the connected printer. Line 30 outputs data 'LINE 1' and a line feed command 'CHR\$(10)' to the printer. After printing 'LINE 3', line 70 tells the printer to eject the cut sheet.

## ● CSF Mode Setting

To have the CSF function properly, the printer must be in the CSF mode by either of the following ways.

1. Using DIP switch 2-1

When DIP switch 2-1 is moved to the ON position at power-on, the printer enters the CSF mode.

2. Using the control code: 

ESC	EM	4
-----	----	---

Function	Symbol	Hex code	Decimal code			
CSF mode designation	<table><tr><td>ESC</td><td>EM</td><td>4</td></tr></table>	ESC	EM	4	(1B, 19, 34)H	(27, 25, 52)D
ESC	EM	4				
CSF mode termination	<table><tr><td>ESC</td><td>EM</td><td>0</td></tr></table>	ESC	EM	0	(1B, 19, 30)H	(27, 25, 48)D
ESC	EM	0				
Paper ejection (In CSF mode)	<table><tr><td>ESC</td><td>EM</td><td>R</td></tr></table>	ESC	EM	R	(1B, 19, 52)H	(27, 25, 82)D
ESC	EM	R				

The control code designations have higher priority over the DIP switch selection.

## ● Features That Change in the CSF Mode

### 1. Inputting the **LF** and **VT** Codes

When a line feed amount exceeds the page length, the cut sheet is ejected and another is loaded automatically.

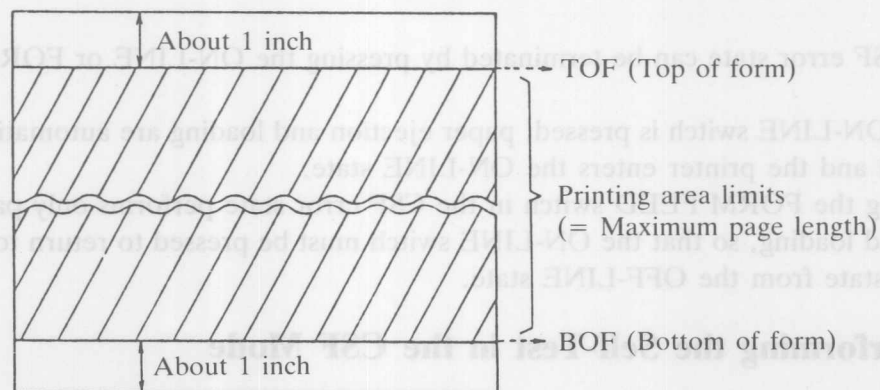
### 2. Inputting the **FF** code

After advancing the cut sheet up to the bottom of form (BOF), the sheet is ejected and another is loaded automatically.

### 3. Specifying a page length

When specifying a page length that is longer than the cut sheet loaded, the BOF automatically becomes the end of the page.

#### Reference: Printing area of cut sheet



As shown above, the top 1 inch and the bottom 1 inch of a cut sheet cannot be used as printing area due to mechanical restrictions.

### 4. Turning power on

In the CSF mode, the printer enters the ON-LINE state at power-on even though paper is empty. When print data followed by a print command is input, a cut sheet is automatically loaded and then printing starts. If a cut sheet has been loaded at power-on, the cut sheet is automatically ejected and another is loaded before printing initiated by a print command starts.

### 5. Designating reverse linefeed

Reverse linefeed designation is ignored in the CSF mode.

## 6. Ignoring the paper out detection

In the CSF mode it is invalid to control the paper out detection by the command. However, this command will become valid when the CSF mode is terminated.

## • CSF Error Conditions

1. If a paper-out condition is not detected while feeding paper for 22 inches from the T.O.F. position, the printer enters the CSF error state.
2. The printer enters the CSF error state if another cut sheet is not loaded after performing linefeeds for 22 inches from the present T.O.F.

**NOTE:** When the printer enters the CSF error state, the P. OUT lamp blinks for 1 second, the buzzer sounds for 1 second, and the ON-LINE lamp is OFF.

## • Error Termination

The CSF error state can be terminated by pressing the ON-LINE or FORM FEED switch.

If the ON-LINE switch is pressed, paper ejection and loading are automatically performed and the printer enters the ON-LINE state.

Pressing the FORM FEED switch in the CSF error state performs only paper ejection and loading, so that the ON-LINE switch must be pressed to return to the ON-LINE state from the OFF-LINE state.

## • Performing the Self-Test in the CSF Mode

When the NLQ or LINE FEED switch is pressed at power-on, the self-test starts. To terminate the self-test, turn the power switch off or press the ON-LINE switch.

## — USING THE OPTIONAL COLOR UNIT (MP-1300 ONLY)

This chapter is for the printer which has the optional color unit installed.

All the descriptions in this chapter are given priority over those in other chapters and are identical whether in Standard or IBM mode.

### Color Self-test

To activate the color self-test, hold down the LINE FEED or NLQ switch as you turn the printer power on. The printer will go through its initialization operations and proceed to print lines in the color sequence of black, red, blue, black, purple, yellow, black, orange and green.

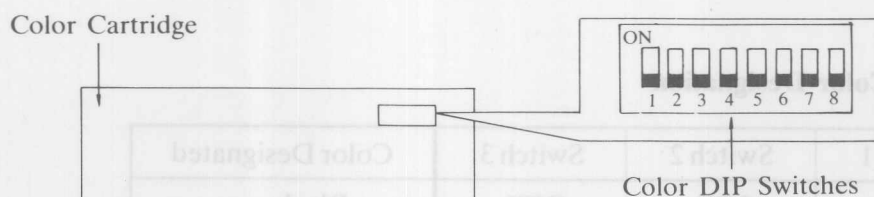
When Color DIP switches 1, 2 and 3 located in the Color Cartridge are not turned off, the self-test is performed only in the designated color.

If the LINE FEED switch is pressed during power-on, self-test printing is performed in Draft Character mode. If the NLQ switch is pressed during power-on, self-test printing is performed in NLQ Character mode.

The printer is in the OFF-LINE state while performing the self-test. To stop the self-test, press the ON-LINE switch. This results in turning the ON-LINE lamp on.

If a paper out is detected during the self-test, self-test printing is terminated.

The self-test does not start in the paper-out state.



## Color DIP Switches

The Color DIP switches, located in the Color Cartridge, select the following functions.

Color DIP Switch	Function	On	Off
1	Printing color designation	See the next table	
2			
3			
4	Selection of black and white reverse printing	Print black when (R, G, B) = (0, 0, 0)	Print black when (R, G, B) = (1, 1, 1)
5	Double-height printing	Enable	Disable
6	Double-width printing	Enable	Disable
7	Not used	—	—
8			

- Note 1. All the switches are turned off when shipped from the factory.
2. Switches 4, 5 and 6 are valid only in the RGB graphic print mode.
3. The DIP switches are read after initialization process either by turning the power switch on or inputting the INITIAL signal.

## Printing Color Designation

Switch 1	Switch 2	Switch 3	Color Designated
OFF	OFF	OFF	Black
OFF	OFF	ON	Green
OFF	ON	OFF	Orange
OFF	ON	ON	Yellow
ON	OFF	OFF	Purple
ON	OFF	ON	Blue
ON	ON	OFF	Red
ON	ON	ON	Black



## Control Codes

### • 7-Color Selection

**[ESC]r n** (1B, 72, n)Hex (27, 114, n)Decimal

n is a binary number or a decimal number where  $0 \leq n \leq 6$ .

The value of n is used to select one of 7 colors.

The color will not change until the next **[ESC]r n** command is input.

n	Color Printed	Ribbon Color Used
0	Black	Black
1	Red	Magenta
2	Blue	Cyan
3	Purple	Mixture of magenta and cyan
4	Yellow	Yellow
5	Orange	Mixture of yellow and magenta
6	Green	Mixture of yellow and cyan.

This color designation is valid for text and ordinary graphic modes excepting the color graphic modes designated by the **[ESC]c** and **[ESC]u** commands.

Color designation may be done any number of times within a given line and the colors may be used in any order.

When power is turned on or when the INITIAL signal is input, DIP switches 1, 2, and 3 select a color to be printed.

#### Program example:

```

10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,CHR$(27);"r";CHR$(0);"Color black"
40 PRINT #1,"This is black.";CHR$(10);
50 PRINT #1,CHR$(27);"r";CHR$(1);"Color red"
60 PRINT #1,"Here is red.";CHR$(10);
70 PRINT #1,CHR$(27);"r";CHR$(2);"Color blue"
80 PRINT #1,"The sky is blue.";CHR$(10);
90 PRINT #1,CHR$(27);"r";CHR$(3);"Color purple"
100 PRINT #1,"How about purple.";CHR$(10);
110 PRINT #1,CHR$(27);"r";CHR$(4);"Color yellow"
120 PRINT #1,"Your banana is yellow.";CHR$(10);
130 PRINT #1,CHR$(27);"r";CHR$(5);"Color orange"
140 PRINT #1,"Orange is beautiful.";CHR$(10);
150 PRINT #1,CHR$(27);"r";CHR$(6);"Color green"
160 PRINT #1,"My lawn is green.";CHR$(10);
170 END

```

**Print sample:**

This is black.  
Here is red.  
The sky is blue.  
How about purple.  
Your banana is yellow.  
Orange is beautiful.  
My lawn is green.

● **Black and white selection**

**ESC w 0 or (00)**

**(1B, 77, 30 or 00) Hex**  
**(27, 119, 48 or 0) Decima**

In the RGB graphic mode, this command designates the mode in which dot data, (R, G, B) = (1, 1, 1), prints black and dot data, (R, G, B) = (0, 0, 0), prints nothing. This command has higher priority over color DIP switch 4.

The mode selected by this command is valid until the **ESC w 1** command is input.

**ESC w 1 or (01)**

**(1B, 77, 31 or 01) Hex**  
**(27, 119, 48 or 1) Decimal**

In the RGB graphic mode, this command specifies the mode in which dot data, (R, G, B) = (0, 0, 0), prints black while dot data, (R, G, B) = (1, 1, 1), does not print anything. This command has higher priority over color DIP switch 4.

The **ESC w 0** command cancels this mode.

# • RGB Graphic Mode

**ESC c k m1 m2 n1 n2**

**(1B, 63, k, m1, m2, n1, n2) Hex**

**(27, 99, k, m1, m2, n1, n2) Decimal**

$1 \leq k \leq 5, 1 \leq m1\ m2 \leq 480 \sim 960, 1 \leq n1\ n2 \leq 1024$

This command allows the color for each dot to be individually specified in a raster scan (RGB) type of horizontal sweep that is similar to the way a TV screen is scanned from the upper left to the lower right.

k specifies the horizontal dot density.

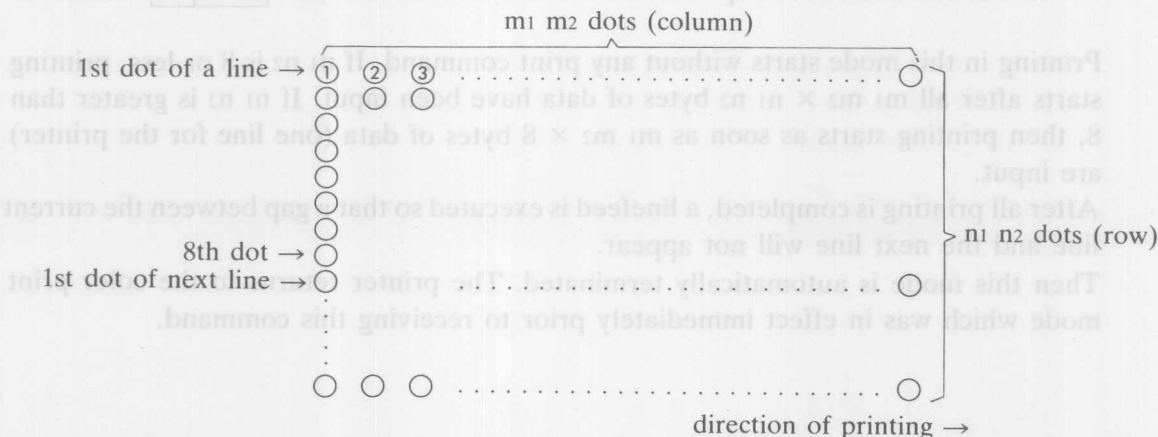
m1 m2 specifies the number of dots to be printed in the horizontal direction.

n1 n2 specifies the number of dots to be printed in the vertical direction.

They are then followed by m1 m2  $\times$  n1 n2 bytes of graphic data.

k	Dot Pitch H $\times$ V (inch)	Ratio H : V	Maximum No. of m1 m2	Maximum No. of n1 n2
1	1/60 $\times$ 1/72	1:0.83	480	1024
2	1/72 $\times$ 1/72	1:1	576	1024
3	1/80 $\times$ 1/72	1:1.11	640	1024
4	1/90 $\times$ 1/72	1:1.25	720	1024
5	1/120 $\times$ 1/72	1:1.71	960	1024

Graphic data for the dots is input in the order 123... as shown below.



$1 \leq k \leq 5, 1 \leq m1\ m2 \leq 480 \sim 960, 1 \leq n1\ n2 \leq 1024$

k, m1 m2 and n1 n2 are binary numbers.

m2 and n2 are the high bytes and m1 and n1 are the low bytes. Therefore, the horizontal and vertical dot numbers are calculated by m1 + 256  $\times$  m2 and n1 + 256  $\times$  n2 respectively.

If any one of k, m1 m2, and n1 n2 is out of its range, the first 7 bytes of this command are ignored.

Each dot is represented by one byte which specifies the color for that dot as follows.

D7	D6	D5	D4	D3	D2	D1	D0	
×	×	×	×	×	B	G	R	×: Not used
B: Blue G: Green R: Red								

RGB (Red, Green and Blue) are the primary colors that make up white light. There are 8 RGB color combinations shown as follows with the corresponding color that is printed:

B	G	R	Color Printed	Ribbon Color Used
0	0	0	*White or Black	Black on the screen
0	0	1	Orange	Mixture of yellow and magenta
0	1	0	Green	Mixture of yellow and cyan
0	1	1	Yellow	Yellow
1	0	0	Purple	Mixture of magenta and cyan
1	0	1	Red	Magenta
1	1	0	Blue	Cyan
1	1	1	*Black or White	White on the screen

\* White means that the printer prints nothing.

White or black selection depends on Color DIP switch 4 and the ESCw command.

Printing in this mode starts without any print command. If  $n_1 n_2$  is 8 or less, printing starts after all  $m_1 m_2 \times n_1 n_2$  bytes of data have been input. If  $n_1 n_2$  is greater than 8, then printing starts as soon as  $m_1 m_2 \times 8$  bytes of data (one line for the printer) are input.

After all printing is completed, a linefeed is executed so that a gap between the current line and the next line will not appear.

Then this mode is automatically terminated. The printer returns to the color print mode which was in effect immediately prior to receiving this command.

# Program Example:

```

10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,CHR$(27);"c";CHR$(1);Maximum col 480
40 PRINT #1,CHR$(0);CHR$(1);1256 column
50 PRINT #1,CHR$(18);CHR$(0);18 rows
60 FOR I=7 TO 0 STEP -1
70 FOR J=1 TO 512
80 PRINT #1,CHR$(I);
90 NEXT J
100 NEXT I
110 FOR J=1 TO 512
120 PRINT #1,CHR$(7);black
130 NEXT J
140 END

```

## Print Example:

Ribbon Color Used	Color Printed	D <sub>0</sub>	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>
Black	Black	1	1	1	1
White	Black	1	1	1	0
Black	Black	1	1	0	1
Black	Black	1	1	0	0
Black	Black	1	0	1	1
Black	Black	1	0	1	0
Black	Black	1	0	0	1
Black	Black	1	0	0	0
Black	Black	0	1	1	1
Black	Black	0	1	1	0
Black	Black	0	1	0	1
Black	Black	0	1	0	0
Black	Black	0	0	1	1
Black	Black	0	0	1	0
Black	Black	0	0	0	1
Black	Black	0	0	0	0

Black  
Blue  
Red  
Purple  
Yellow  
Green  
Orange  
White  
Black

## • Ribbon-Color Graphic Mode

ESC	u	k	m1	m2	n1	n2
-----	---	---	----	----	----	----

(1B, 75, k, m1, m2, n1, n2) Hex

(27, 117, k, m1, m2, n1, n2) Decimal

This command allows the color for each dot to be individually specified in the 'ribbon-color' correspondence method. It is a raster scan method similar to the RGB method except that the color code is a correspondence to each of the 4 ribbon colors. Each dot is represented by one byte with the color being selected as shown below:

D7	D6	D5	D4	D3	D2	D1	D0	
×	×	×	×	Black	Cyan	Magenta	yellow	×: Not used

These 4 colors correspond to the ribbon color stripes.

There are 9 combinations of D0, D1, D2, and D3.

These are listed in the table below:

D3	D2	D1	D0	Color Printed	Ribbon Color Used
0	0	0	0	White	The printer prints nothing
0	0	0	1	Yellow	Yellow
0	0	1	0	Red	Magenta
0	0	1	1	Orange	Mixture of yellow and magenta
0	1	0	0	Blue	Cyan
0	1	0	1	Green	Mixture of yellow and cyan
0	1	1	0	Purple	Mixture of magenta and cyan
0	1	1	1	Black	Black
1	×	×	×	Black	Black

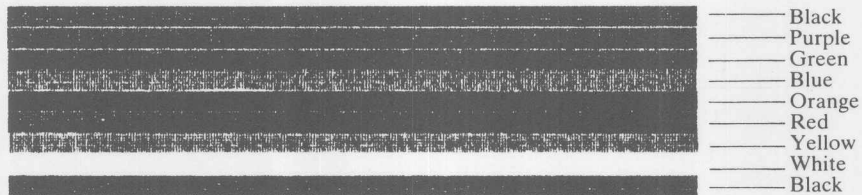
×: Don't care

The others including k, m1, m2, n1, n2, and input sequence of color dot data are the same as the `ESC c` command.

**Program Example:**

```
10 OPEN "LPT1:" AS #1
20 WIDTH #1,255
30 PRINT #1,CHR$(27);"u";CHR$(2);"Maximum col. 576"
40 PRINT #1,CHR$(0);CHR$(1);"256 column"
50 PRINT #1,CHR$(72);CHR$(0);"72 rows"
60 FOR I=7 TO 0 STEP -1
70 FOR J=1 TO 2048
80 PRINT #1,CHR$(I);
90 NEXT J
100 NEXT I
110 FOR J=1 TO 2048
120 PRINT #1,CHR$(8);"black"
130 NEXT J
140 END
```

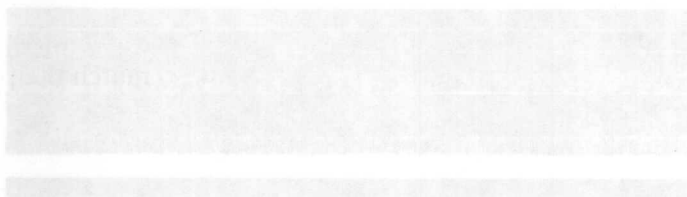
**Print Example:**



## — CAUTIONS FOR USE —

- Do not use a power supply voltage that is out of the specified range.
- Do not touch the print head immediately after printing because it is too hot.
- Be careful not to twist the ribbon while installing it.
- Wait at least two seconds after turning power off before turning it back on again. The initialization process may not be performed correctly if this is not done.
- The printer should be used where the humidity is low, where there is little dust, and where the printer is not in direct sunlight.
- Do not perform printing without the ribbon cassette and paper properly installed.
- Never install the tractor unit when using friction feed for cut sheet paper.
- When using continuous forms, the paper bail must be set to the back by hand while the paper loading lever is set to the front (pin feed side).
- Put the printer on a flat, firm table or desk, otherwise the plastic bottom enclosure may be deformed due to the heavy transformer in the printer.
- Never have your long hair be caught in the printer while printing.

Black  
Purple  
Green  
Blue  
Orange  
Red  
Yellow  
White  
Black





## **—TROUBLESHOOTING—**

Use the table below to diagnose any problems that may occur. If you cannot solve the problem, try to decide what part of your system is not working properly and consult your dealer.

<b>PROBLEM</b>	<b>CAUSE AND REMEDY</b>
The printer does not print. The POWER lamp does not light.	1) Power is not getting to the printer. • Check the power cord and power switch.
The printer does not print. The POWER lamp is lit.	1) The connection to the computer is not correct. • Check that the cable connecting the printer and computer is correctly connected. 2) The printer cover is not closed. • Close it properly.
The printer is operating properly, but the paper is not feeding through properly.	1) The paper is jammed in the printer. • Remove the paper and reinsert it properly.
The print is light or smeared.	1) The print head position is not correct. • Move the head adjustment lever to match the paper being used. 2) The ribbon cassette is not properly installed. • Properly install the cassette. 3) The ink ribbon is old or is worn out. • Replace the old ribbon cassette with a new one.
The PAPER OUT lamp is blinking.	1) An error condition has been detected. • Turn power off and then back on again.

## APPENDIX A GLOSSARY

### ASCII

American Standard Code for Information Interchange.

This code consists of binary numbers and decimal numbers that represent characters and control codes.

#### Example:

ASCII Character	Hex	Decimal
A	41	65
B	42	66
C	43	67
0 (Zero)	30	48
2	32	50
4	34	52

### baud rate

A measure of the data transmission speed.

One baud is equivalent to one bit per second.

### BASIC

Beginner's All-Purpose Symbolic Instruction Code.

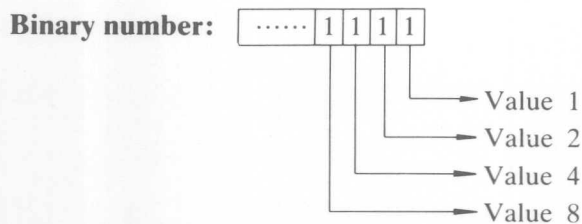
A high level programming language designed for ease of use. It is now a standard programming language for microcomputers.

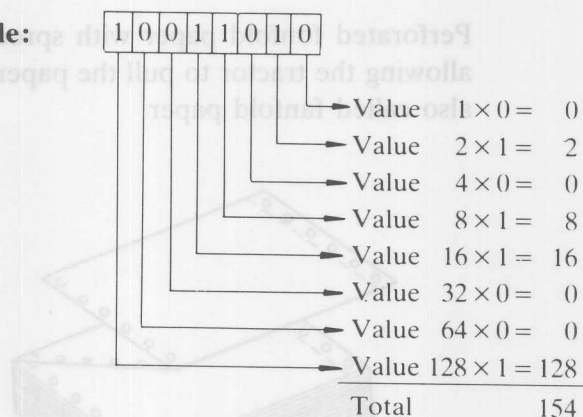
### bidirectional printing

The printing direction of consecutive lines is alternated to speed up the printing.

### binary

A base 2 number system using only the digits zero (0) and one (1). The right most digit of a binary number has a value of 1, the next a value of 2, then 4, 8, and so on.

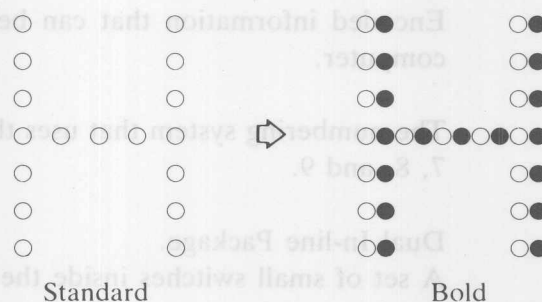


**Example:****bit**

An abbreviation for a binary digit.  
Each bit is either zero or one.

**bold characters**

Characters which appear darker than normal to give emphasis.  
Each dot of a character is printed again slightly to the right of the initial dot.

**buffer**

Storage memory which keeps input data temporarily until it can be printed.

**byte**

One byte consists of 8 bits.

**carriage return**

The control character that makes a printer start a new line.

**character**

Any symbol that represents a digit, letter, or other symbol.

**commands**

Orders used to tell the printer to perform something.

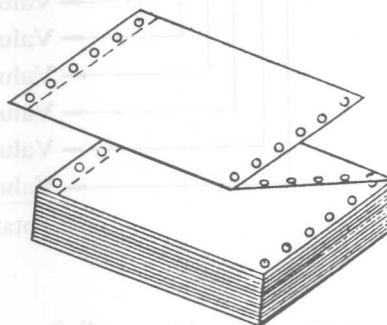
**condensed**

Printing in which each character is narrower than Pica or Elite character.

PICA	:	ABCDEF
ELITE	:	ABCDEF
CONDENSED	:	ABCDEF

**continuous forms**

Perforated fonfold paper with sprocket holes along both sides, allowing the tractor to pull the paper through the printer. This is also called fanfold paper.



**CPI**

Characters Per Inch

**CPS**

Characters Per Second

**data**

Encoded information that can be processed or produced by a computer.

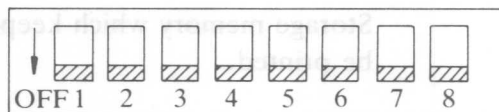
**decimal**

The numbering system that uses the numerals 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9.

**DIP switch**

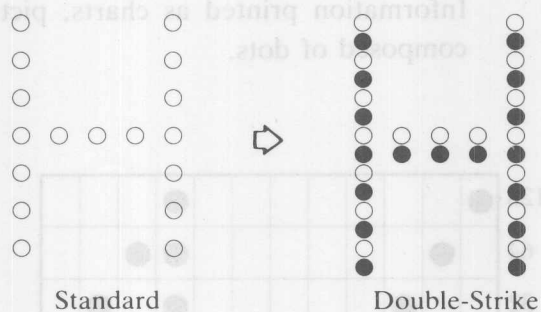
Dual In-line Package.

A set of small switches inside the printer.

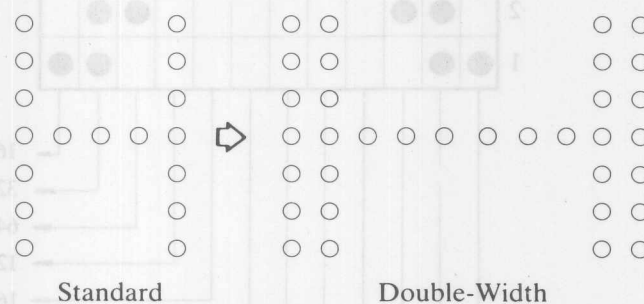


**double-strike printing**

Characters are printed twice to have darker ones. In the second pass, the dots are printed slightly below the initial dots.

**double-width**

A feature that allows standard character to be printed double their width: 10 CPI (Pica) becomes 5 CPI.

**elite**

A term used to describe 12 cpi printing.

**form feed**

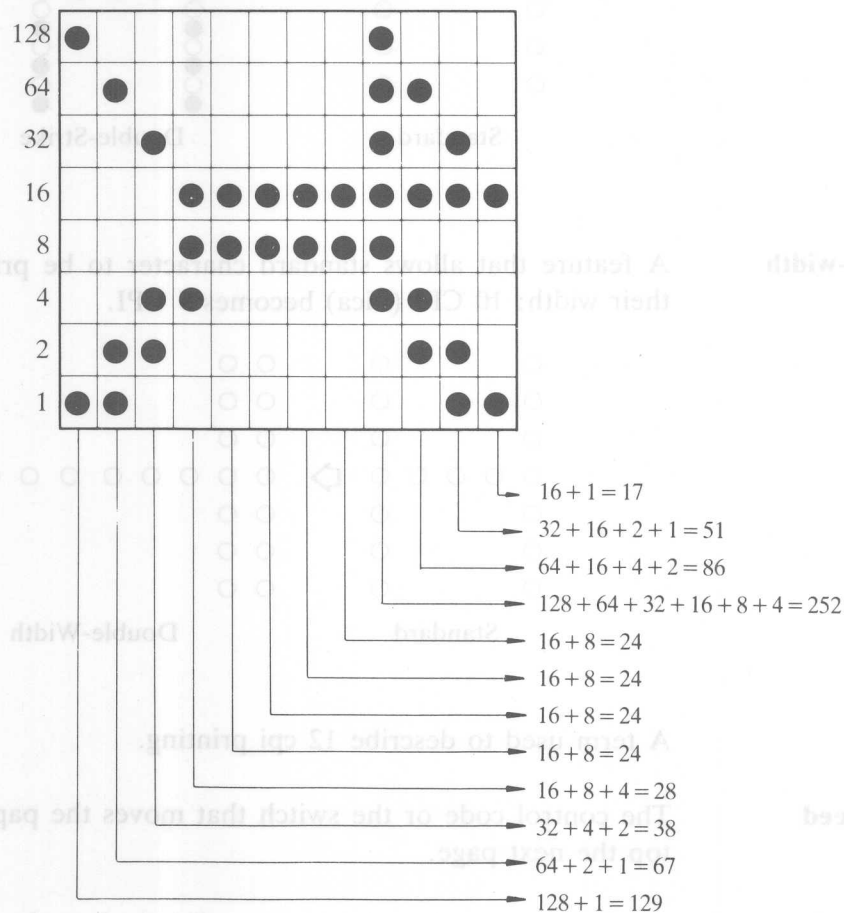
The control code or the switch that moves the paper up to the top the next page.

**friction feed**

Advancing paper by using pressure (friction) on the paper to pull it through the printer.

**graphics  
printing**

Information printed as charts, pictures or drawings which are composed of dots.



**hex or  
hexadecimal**

A numbering system that uses 16 as its base.  
Letters A to F are, respectively, representing numbers 10 to 15 respectively.

**Example:**

Hexadecimal	Decimal	Binary
0	0	0000
1	1	0001
2	2	0010
3	3	0011
4	4	0100
5	5	0101
6	6	0110
7	7	0111
8	8	1000
9	9	1001
A	10	1010
B	11	1011
C	12	1100
D	13	1101
E	14	1110
F	15	1111

**input**

Information received by the computer or the printer from outside.

**interface**

A connection which provides communication between the computer and the printer.

Parallel and serial interfaces are the 2 basic connections.

**line feed**

The control character or the switch that moves the paper forward by one line.

**LSB**

Least Significant Bit.

The farthest right digit in a binary number.

1 byte: 1 0 1 0 0 1 0 1

↑  
LSB

**MSB**

Most Significant Bit.

The farthest left digit in a binary number.

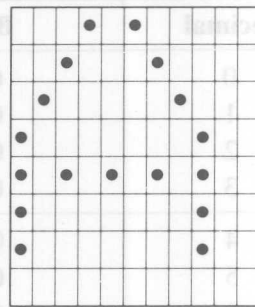
1 byte: 1 0 0 0 1 0 1 0 1

↑  
MSB

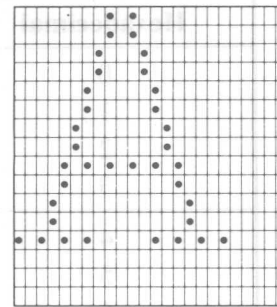
## NLQ

Near Letter Quality.

A style of printing that allows much greater definition than standard quality.



Standard



NLQ

## off-line

Not having direct interaction with computer. In the off-line mode, the printer cannot receive any data from the computer.

## on-line

When the printer is in on-line mode, the connected computer can transmit data to the printer.

## output

Information printed out on paper by the printer or transmitted by the computer to the printer.

## parallel interface

A data transmission connection which has a separate wire for each of the data bits. Therefore, 8 bits (1 byte) can be transmitted simultaneously.

## pica

A term used to describe 10 cpi printing.

## pin feed

A system which moves paper through the printer using pins. They engage in holes along the edges of the paper.

## proportional printing

Printing in which wide characters like 'W' and 'M' are given more space than narrow ones like 'i'.

STANDARD : Proportionally  
PROPORTIONAL : Proportionally

## protocol

A protocol, which is a set of rules for serial communication, determines how data is transmitted and received between the computer and the printer.



**RAM**

Random Access Memory

This temporary memory is random because it provides immediate access to any storage location in the memory. Data may be written in or read out while the power is supplied. Data stored will be lost once the power is turned off.

**ROM**

Read Only Memory

A memory where data is stored permanently or semi-permanently and can be read out, but not altered while in regular use.

**serial interface**

A data transmission connection in which data is sent bit by bit sequentially over a pair of wires with start and stop bits to indicate the beginning and end of each byte.

**tab**

Commands the printer to start printing at a certain location. There are 2 such commands: horizontal tab and vertical tab.

**TOF**

Top of Form

The location on a page where the first line of printing will appear.

**unidirectional printing**

All printing is performed from left to right.

## APPENDIX B DEFAULT SETTINGS

Printer initialization is accomplished in one of the following 3 ways.

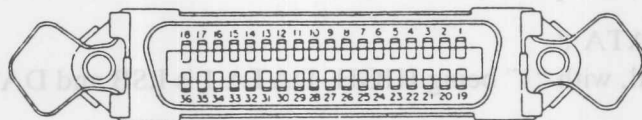
1. The power switch is turned off and then back on again.
2. The INITIAL signal is sent to pin 31 of a Parallel Interface.
3. The `[ESC][@]` command is input.

The following default settings are automatically selected each time initialization takes place.

Item	Default settings		
	1. Power-on	2. INITIAL signal	3. <code>[ESC][@]</code> command
Interface reset and ACK output	Performed		Unperformed
DIP switch reading	Performed		Unperformed
Self test and input data dump	Performed		Unperformed
Print head position	Home position		
Print data	Cleared		
Margin setting	Cleared		
Horizontal tab	Every 8th column		
Vertical tab	Cleared. Channel 0 is selected		
Linefeed pitch	1/6"		
Character mode	Draft, 10 CPI		10 CPI, Draft or NLQ previously designated by the switch.
TOP	Present position		
Download area	Cleared		
Page length	11" or 12", selected by DIP switch 1-4		Returns to the selection at power-on
International characters	Selected by DIP switch 1-1 to 1-3		Returns to the selection at power-on
CSF mode	Set by DIP switch 2-1		Remains unchanged
Linefeed pitch for <code>[ESC][3][n]</code> , <code>[ESC][J][n]</code> , and <code>[ESC][j][n]</code>	n/216"		

## —APPENDIX C PARALLEL INTERFACE—

### 1. Input Connector



Signal Diagram

PIN	SIGNAL	IN/OUT	PIN	SIGNAL	IN/OUT
1	STROBE	IN	19	GND	
2	DATA 1	IN	20	GND	
3	DATA 2	IN	21	GND	
4	DATA 3	IN	22	GND	
5	DATA 4	IN	23	GND	
6	DATA 5	IN	24	GND	
7	DATA 6	IN	25	GND	
8	DATA 7	IN	26	GND	
9	DATA 8	IN	27	GND	
10	ACK	OUT	28	GND	
11	BUSY	OUT	29	GND	
12	P. EMP	OUT	30	GND	
13	HIGH 1		31	INITIAL	IN
14	AUTO FEED	IN	32	ERROR	OUT
15	NC		33	GND	
16	GND		34	NC	
17	CHASSIS GND		35	HIGH 2	
18	NC		36	NC	

Note 1

Note 2

**Note 1:** High 1 is connected through a 2.2 k $\Omega$  pull-up resistor to +5V.

**Note 2:** High 2 is connected through a 3.3 k $\Omega$  pull-up resistor to +5V.

**Note 3:** NC stands for lines Not Connected.

## 2. Signal Explanations

### (a) Input signals to the printer.

- \* DATA 1 – DATA 8  
8-bit data signal, with “1” being HIGH. DATA 1 is LSB and DATA 8 is MSB.
- \* STROBE  
Strobe signal used to read 8 bits of data. Data is input when the signal is LOW.
- \* INITIAL  
Puts the printer into its initial state. It is usually HIGH. When it goes LOW and then HIGH again, the printer is initialized.
- \* AUTOFEED  
When DIP switch 1-7 is off, bringing this signal LOW adds a linefeed execution to the CR code.  
When DIP switch 1-7 is on, the CR code always performs a carriage return and line feed. This signal is connected to DIP switch 1-7 within the printer. The ESC5 command overrides this signal to control the CR code execution.

### (b) Signals from the printer

- \* BUSY  
This signal shows that the printer is in the BUSY state. When it is HIGH, data cannot be received. The following are conditions for which a HIGH BUSY signal is output.
  - 1) While performing initialization operations.
  - 2) While the printer is inputting data with the STROBE signal.
  - 3) During the self-test.
  - 4) When the printer is in the OFF-LINE state. (At this time, the ON-LINE lamp is not lit.)
    - Paper out state.
    - An error is detected. (The PAPER OUT Lamp is blinking.)
    - By pressing the ON-LINE switch to enter the OFF-LINE state.
  - 5) During the margin setting process.
- \* ACK  
When the BUSY state has been entered due to the above reasons except for 4) and 5), this signal, which is synchronized with the falling edge of the BUSY signal, is output.
- \* P. EMP  
This signal goes HIGH when the printer is out of paper.

\* ERROR

This signal goes LOW to show that the printer is in the error state.

The following conditions will cause errors.

- (1) If an internal RAM error is detected during the initialization operations.
- (2) If the home position is not detected during the home detection process.
- (3) If a paper out is detected.
- (4) When in the OFF-LINE state.

When the PAPER OUT lamp is blinking due to an ERROR state caused by (1) or (2), turn the switch off and then on again, or input the INITIAL signal in order to terminate the error state.

The ERROR signal immediately goes HIGH if paper is inserted when in the PAPER OUT condition.

### 3. Electrical Conditions

#### (a) Signal levels

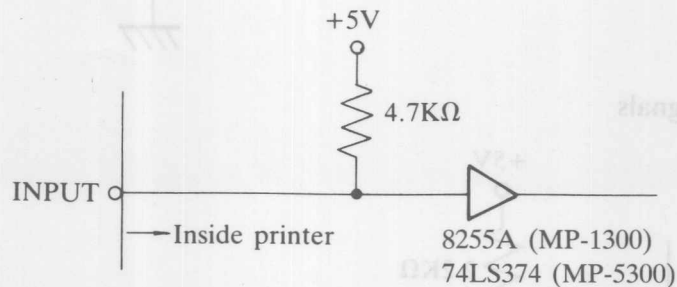
All signals are TTL level.

High level .....	+2.4V ~ 5.0V	Measured at the input pins on the printer.
Low level .....	0V ~ 0.4V	

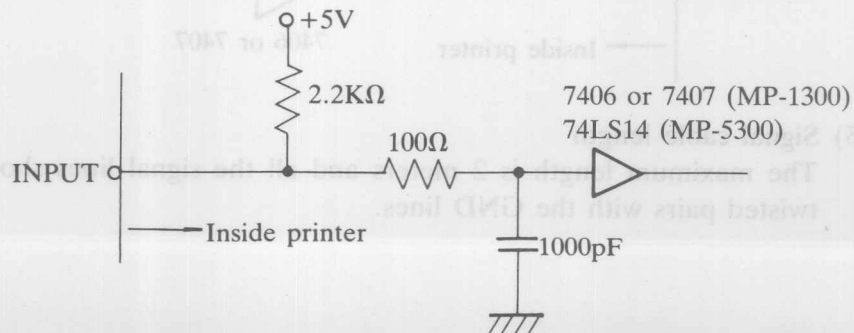
#### (b) Input/output conditions

##### 1) Input signals

- DATA 1 ~ DATA 8

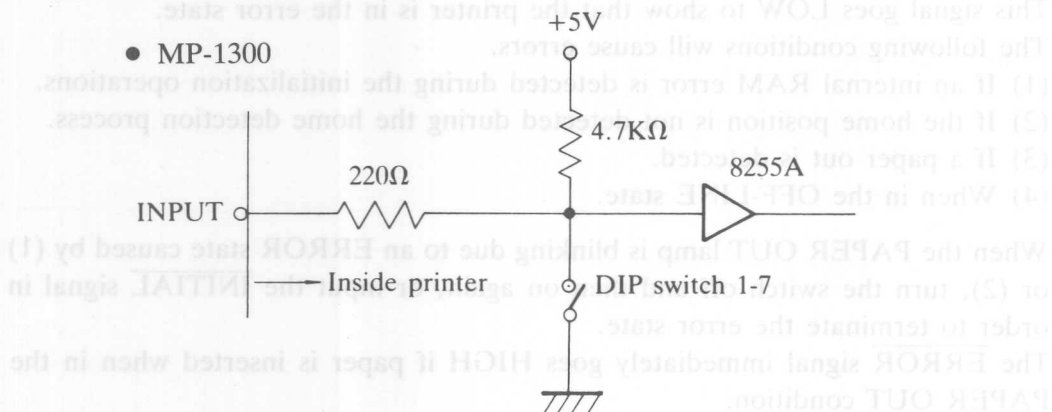


##### 2) INITIAL and STROBE signals

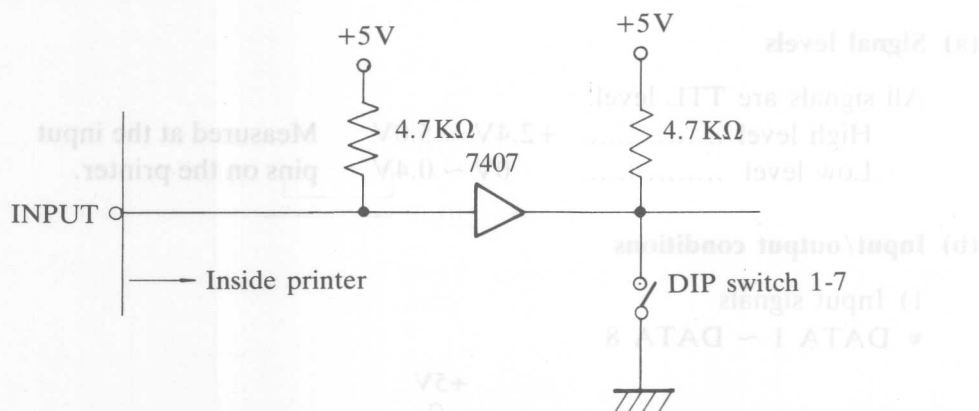


3) AUTO FEED signal

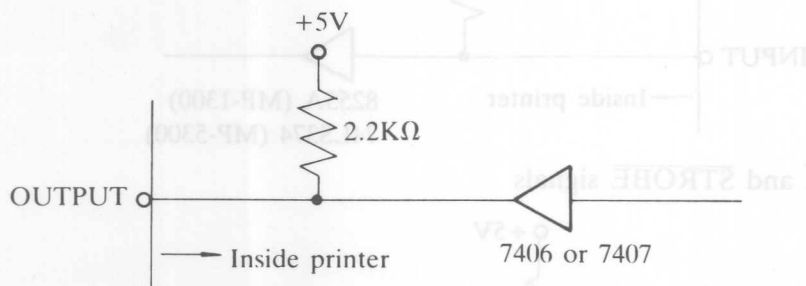
- MP-1300



- MP-5300



4) Output signals

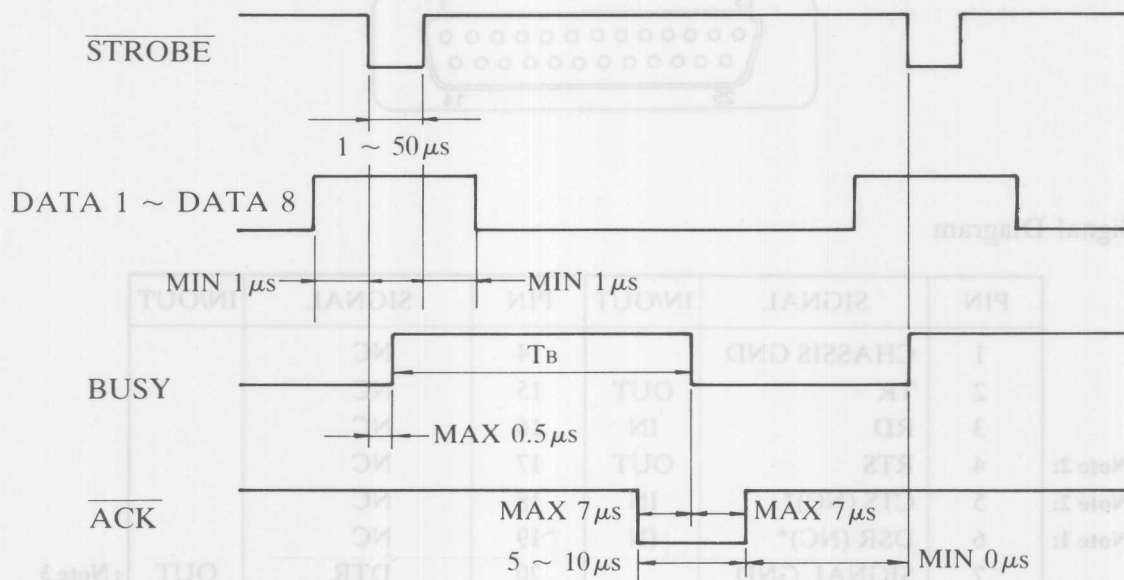


5) Signal cable length

The maximum length is 2 meters and all the signal lines should be run as twisted pairs with the GND lines.

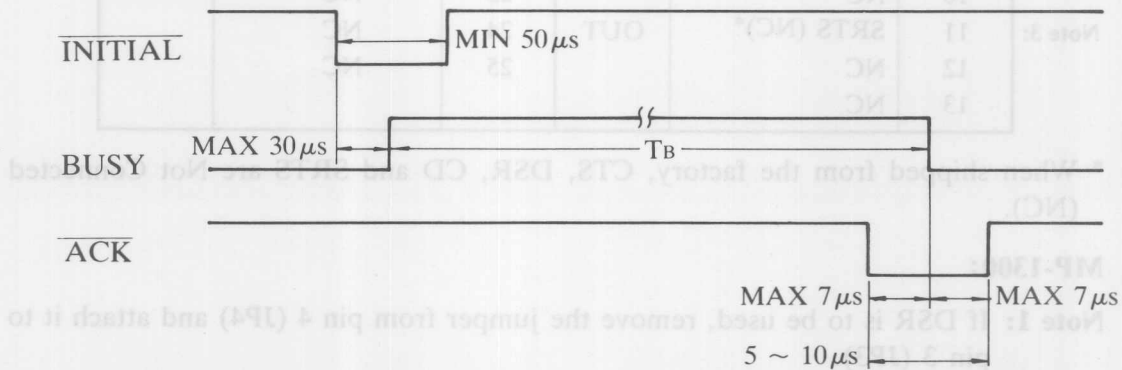
## 4. Timing Chart

### (a) Data input



$T_B$ : differs depending on the input data.

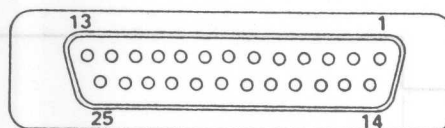
### (b) Initialization



$T_B$ : differs depending on the position of the head carrier.

# 1. Input Connector

25 pin D-SUB type connector



Signal Diagram

PIN	SIGNAL	IN/OUT	PIN	SIGNAL	IN/OUT
1	CHASSIS GND		14	NC	
2	TR	OUT	15	NC	
3	RD	IN	16	NC	
<b>Note 2:</b> 4	RTS	OUT	17	NC	
<b>Note 2:</b> 5	CTS (NC)*	IN	18	NC	
<b>Note 1:</b> 6	DSR (NC)*	IN	19	NC	
7	SIGNAL GND		20	DTR	OUT : <b>Note 3</b>
<b>Note 1:</b> 8	CD (NC)*	IN	21	NC	
9	NC		22	NC	
10	NC		23	NC	
<b>Note 3:</b> 11	SRTS (NC)*	OUT	24	NC	
12	NC		25	NC	
13	NC				

\* When shipped from the factory, CTS, DSR, CD and SRTS are Not Connected (NC).

## MP-1300:

**Note 1:** If DSR is to be used, remove the jumper from pin 4 (JP4) and attach it to pin 3 (JP3).

If CD is to be used, remove the jumper from pin 6 and attach it to pin 5 (JP5).

**Note 2:** RTS is connected to CTS by the jumper on pin 2 (JP2). When using CTS, remove the jumper from pin 2 (JP2) and attach it to pin 1 (JP1).

**Note 3:** DTR is output at SRTS if the jumper is removed from pin 8 (JP8) and attached to pin 7 (JP7).



**MP-5300 :**

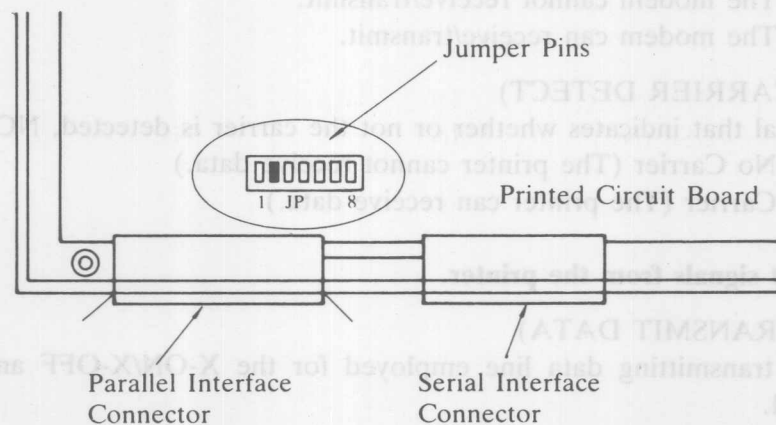
**Note 1:** If DSR is to be used, remove the jumper from pin 2 (JP2) and attach it to pin 7 (JP7).

If CD is to be used, remove the jumper from pin 3 and attach it to pin 6 (JP6).

**Note 2:** RTS is connected to CTS by the jumper on pin 1 (JP1). When using CTS, remove the jumper from pin 1 (JP1) and attach it to pin 8 (JP8).

**Note 3:** DTR is output at SRTS if the jumper is removed from pin 5 (JP5) and attached to pin 4 (JP4).

**Caution:** These jumper pins are located on the printed circuit board in the printer. Therefore, to change jumper pin connections, bring the printer into the store where you made the purchase.



**(MP-1300)**

## 2. Signal Explanations

### (a) Printer input signals

#### \* RD (RECEIVED DATA)

This line is the data input line for the serial signals from the computer. The data consists of a start bit, data (parity bit), and stop bit.

Data length 7 or 8 bits.

With or without parity bit.

Odd or even parity

} DIP switch selectable

#### \* CTS (CLEAR TO SEND)

A data transmission control signal, NC (No Connection).

OFF: Data transmission to a computer is prohibited.

ON: Data transmission to a computer is possible.

#### \* DSR (DATA SET READY)

A signal that displays the state of the modem, NC.

OFF: The modem cannot receive/transmit.

ON: The modem can receive/transmit.

#### \* CD (CARRIER DETECT)

A signal that indicates whether or not the carrier is detected, NC.

OFF: No Carrier (The printer cannot receive data.)

ON: Carrier (The printer can receive data.)

### (b) Output signals from the printer.

#### \* TR (TRANSMIT DATA)

Serial transmitting data line employed for the X-ON/X-OFF and ETX/ACK control.

#### \* RTS (REQUEST TO SEND)

A signal that tells the modem to transmit carrier.

OFF: No carrier.

ON: Transmit carrier.

#### \* SRTS (SECONDARY REQUEST TO SEND)

This is a handshaking signal representing the printer's BUSY state.

OFF: BUSY.

ON: READY.

#### \* DTR (DATA TERMINAL READY)

This signal controls the state of the modem.

OFF: Modem transmitting/receiving cannot be performed.

ON: Modem transmitting/receiving can be performed.

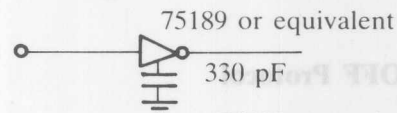
### 3. Electrical Conditions

#### (a) Signal level

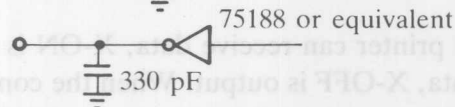
ON	Space	+3V ~ +15V
OFF	Mark	-3V ~ -15V

#### (b) Input/output conditions

• Input signal [INPUT]



• Output signal [OUTPUT]



### 4. Handshake Protocol

#### DIP switch handshake protocol selection

Protocol \ DIP switch	SW 2-4	SW 2-5
PARALLEL	OFF	OFF
READY/BUSY	ON	OFF
X-ON/X-OFF	OFF	ON
ETX/ACK	ON	ON

#### (a) READY/BUSY Protocol

MP-1300:

The DTR line indicates the READY/BUSY state of the printer. When READY an ON (+12V) and when BUSY an OFF (-12V) is output. When the remaining space of the 10K-byte communication buffer (7K-byte when the download character mode is selected) goes below 2K bytes, the DTR line turns OFF, terminating the transmission of data from the computer. Then when the buffer space increases to above the 5K-byte level the DTR line turns ON, allowing data to be sent from the computer. The DTR line turns OFF when the printer cover is opened or a paper out is detected. The SRTS line output is identical to the DTR output. The printer can receive up to 2K bytes more after the DTR line goes 'OFF'.

MP-5300:

The DTR line indicates the READY/BUSY state of the printer. When READY an ON (+12V) and when BUSY an OFF (-12V) is output. When the remaining space of the 6K-byte communication buffer (3K-byte when the download character mode is selected) goes below 1K bytes, the DTR line turns OFF, terminating the transmission of data from the computer. Then when the buffer space increases to above the 2K-byte level the DTR line turns ON, allowing data to be sent from the computer. The DTR line turns OFF when the printer cover is opened or a paper out is detected. The SRTS line output is identical to the DTR output. The printer can receive up to 1K bytes more after the DTR line goes 'OFF'.

#### (b) X-ON/X-OFF Protocol

When the printer can receive data, X-ON is output. When the printer is not able to receive data, X-OFF is output. When the computer receives the X-OFF signal, transmission of data to the printer is terminated. If the X-ON signal is then received, data is transmitted once again. When the communication buffer space goes below 2K bytes (MP-1300) or 1K bytes (MP-5300), X-OFF is sent. When the buffer space goes beyond 5K bytes (MP-1300) or 2K bytes (MP-5300), X-ON is sent.

X-ON is DC1 (11 HEX) and X-OFF is DC3 (13 HEX). These signals are output through the TR lines. The data format is the same as the input data structure.

#### (c) ETX/ACK Protocol

The printer sends an ACK (06 HEX) to the computer in response to the data block separated by ETX (03 HEX) which was sent by the computer. If the communication buffer space goes below 2K bytes (MP-1300) or 1K bytes (MP-5300), ACK is not sent. If the buffer space is more than 5K bytes (MP-1300) or 2K bytes (MP-5300), ACK is sent through the TR line. The ACK output data format is the same structure as the input data.

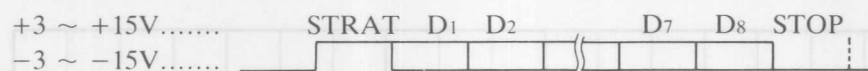
### 5. Baud Rate (Data Transfer Rate)

4 baud rates may be selected by DIP switches.

Baud rate	DIP switch	
	SW 2-2	SW 2-3
1200 BPS	OFF	OFF
2400 BPS	ON	OFF
4800 BPS	OFF	ON
9600 BPS	ON	ON

BPS: Bit Per Second

## 6. Serial Data Frame



Start bit ..... 1 bit  
 Data bits ..... 7 or 8 bits  
 Parity bit ..... 0 or 1 bit  
 Stop bit(s) ..... 1 bit or more

Space: logical '0' (+3 ~ +15V)

Mark: logical '1' (-3 ~ -15V)

### (a) Data Length 7 or 8 Bit Selection

A 7-bit or 8-bit data length may be selected by DIP switch 2-8. When the switch is ON, the 7-bit length is selected. When the switch is OFF, the 8-bit length is selected.

### (b) Stop Bit

One bit or more is required for the stop bits. However, only when the 7-bit data length and no parity are selected, is there a need for 2 or more stop bits.

### (c) Parity

Whether a parity bit is to be used, and whether odd or even parity is to be used is selected by DIP SW 2-6 and DIP SW 2-7.

Parity \ DIP switch	SW 2-6	SW 2-7
No Parity	OFF	OFF
No Parity	ON	OFF
Odd Parity	OFF	ON
Even Parity	ON	ON

**Note:** Perform all DIP switch selections with the power OFF.

# APPENDIX E CHARACTER SET TABLE

## STANDARD CHARACTER SET (IN STANDARD MODE)

Upper Bit Lower Bit	Hex.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Hex.	Binary	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	NUL		SP	0	@	P	`	p			SP	0	@	P	`	p
		0	16	32	48	64	80	96	112	128	144	160	176	192	208	224	240
1	0001		DC1	!	1	A	Q	a	q		DC1	!	1	A	Q	a	q
		1	17	33	49	65	81	97	113	129	145	161	177	193	209	225	241
2	0010		DC2	"	2	B	R	b	r		DC2	"	2	B	R	b	r
		2	18	34	50	66	82	98	114	130	146	162	178	194	210	226	242
3	0011		DC3	#	3	C	S	c	s		DC3	#	3	C	S	c	s
		3	19	35	51	67	83	99	115	131	147	163	179	195	211	227	243
4	0100		DC4	\$	4	D	T	d	t		DC4	\$	4	D	T	d	t
		4	20	36	52	68	84	100	116	132	148	164	180	196	212	228	244
5	0101			%	5	E	U	e	u			%	5	E	U	e	u
		5	21	37	53	69	85	101	117	133	149	165	181	197	213	229	245
6	0110			&	6	F	V	f	v			&	6	F	V	f	v
		6	22	38	54	70	86	102	118	134	150	166	182	198	214	230	246
7	0111	BEL		'	7	G	W	g	w	BEL		'	7	G	W	g	w
		7	23	39	55	71	87	103	119	135	151	167	183	199	215	231	247
8	1000	BS	CAN	(	8	H	X	h	x	BS	CAN	(	8	H	X	h	x
		8	24	40	56	72	88	104	120	136	152	168	184	200	216	232	248
9	1001	HT	EM	)	9	I	Y	i	y	HT	EM	)	9	I	Y	i	y
		9	25	41	57	73	89	105	121	137	153	169	185	201	217	233	249
A	1010	LF		*	:	J	Z	j	z	LF		*	:	J	Z	j	z
		10	26	42	58	74	90	106	122	138	154	170	186	202	218	234	250
B	1011	VT	ESC	+	;	K	[	k	{	VT	ESC	+	;	K	[	k	{
		11	27	43	59	75	91	107	123	139	155	171	187	203	219	235	251
C	1100	FF		.	<	L	\	l	/	FF		.	<	L	\	l	/
		12	28	44	60	76	92	108	124	140	156	172	188	204	220	236	252
D	1101	CR	GS	-	=	M	]	m	}	CR	GS	-	=	M	]	m	}
		13	29	45	61	77	93	109	125	141	157	173	189	205	221	237	253
E	1110	SO		.	>	N	^	n	~	SO		.	>	N	^	n	~
		14	30	46	62	78	94	110	126	142	158	174	190	206	222	238	254
F	1111	SI		/	?	O	_	o	DEL	SI		/	?	O	_	o	DEL
		15	31	47	63	79	95	111	127	143	159	175	191	207	223	239	255

!"#\$%&'()\*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^\_`abcdefghijklmnopqrstuvwxyz{|}~ !"#\$%&'()\*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^\_`abcdefghijklmnopqrstuvwxyz{|}~

**Note:** When U.S.A. font is selected.



## IBM CHARACTER SET 1 (IN IBM MODE)

Upper Bit Lower Bit	Hex.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Hex.	Binary	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	NUL		SP	0	@	P	`	p			á	⌘	⌘	⌘	α	≡
		0	16	32	48	64	80	96	112	128	144	160	176	192	208	224	240
1	0001		DC1	!	1	A	Q	a	q		DC1	i	⌘	⌘	⌘	β	±
		1	17	33	49	65	81	97	113	129	145	161	177	193	209	225	241
2	0010		DC2	"	2	B	R	b	r		DC2	ó	⌘	⌘	⌘	Γ	≥
		2	18	34	50	66	82	98	114	130	146	162	178	194	210	226	242
3	0011		DC3	#	3	C	S	c	s		DC3	ú	⌘	⌘	⌘	Π	≤
		3	19	35	51	67	83	99	115	131	147	163	179	195	211	227	243
4	0100		DC4	\$	4	D	T	d	t		DC4	ñ	⌘	⌘	⌘	Σ	⌘
		4	20	36	52	68	84	100	116	132	148	164	180	196	212	228	244
5	0101			%	5	E	U	e	u			Ñ	⌘	⌘	⌘	σ	⌘
		5	21	37	53	69	85	101	117	133	149	165	181	197	213	229	245
6	0110			&	6	F	V	f	v			ä	⌘	⌘	⌘	μ	÷
		6	22	38	54	70	86	102	118	134	150	166	182	198	214	230	246
7	0111	BEL		'	7	G	W	g	w	BEL		ó	⌘	⌘	⌘	τ	≈
		7	23	39	55	71	87	103	119	135	151	167	183	199	215	231	247
8	1000	BS	CAN	(	8	H	X	h	x	BS	CAN	¿	⌘	⌘	⌘	⌘	°
		8	24	40	56	72	88	104	120	136	152	168	184	200	216	232	248
9	1001	HT	EM	)	9	I	Y	i	y	HT	EM	⌘	⌘	⌘	⌘	θ	■
		9	25	41	57	73	89	105	121	137	153	169	185	201	217	233	249
A	1010	LF		*	:	J	Z	j	z	LF		⌘	⌘	⌘	⌘	Ω	-
		10	26	42	58	74	90	106	122	138	154	170	186	202	218	234	250
B	1011	VT	ESC	+	:	K		k	{	VT	ESC	½	⌘	⌘	⌘	δ	√
		11	27	43	59	75	91	107	123	139	155	171	187	203	219	235	251
C	1100	FF		.	<	L	\	l		FF		¼	⌘	⌘	⌘	∞	"
		12	28	44	60	76	92	108	124	140	156	172	188	204	220	236	252
D	1101	CR	GS	-	=	M		m	}	CR	GS	ı	⌘	⌘	⌘	∅	ˆ
		13	29	45	61	77	93	109	125	141	157	173	189	205	221	237	253
E	1110	SO		.	>	N	^	n	~	SO		«	⌘	⌘	⌘	ε	■
		14	30	46	62	78	94	110	126	142	158	174	190	206	222	238	254
F	1111	SI		/	?	O	_	o		SI		»	⌘	⌘	⌘	∩	SP
		15	31	47	63	79	95	111	127	143	159	175	191	207	223	239	255

Graphic Elements

**Note:** When U.S.A. font is selected.

Graphic Elements

!"#\$%&'()\*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN O PQRSTU VWX  
 YZ[\]^\_`abcdefghijklmnopqrstuvwxyz{|}~¡¢£¥¦§¨ª«¬®¯°±²³´µ¶·¸¹º»¼½¾¿  
 ¡ ¢ £ ¥ ¦ § ¨ ª « ¬ ® ¯ ° ± ² ³ ´ µ ¶ · ¸ ¹ º » ¼ ½ ¾ ¿

## IBM CHARACTER SET 2 (IN IBM MODE)

Upper Bit Lower Bit		Hex.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Hex.		Binary	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	NUL		SP	0	(a	P	`	p	Ç	É	á	␣	␣	␣	α	≡	
		0	16	32	48	64	80	96	112	128	144	160	176	192	208	224	240	
1	0001		DC1	!	1	A	Q	a	q	ü	æ	í	␣	␣	␣	β	±	
		1	17	33	49	65	81	97	113	129	145	161	177	193	209	225	241	
2	0010		DC2	"	2	B	R	b	r	é	Æ	ó	␣	␣	␣	Γ	≧	
		2	18	34	50	66	82	98	114	130	146	162	178	194	210	226	242	
3	0011	♥	DC3	#	3	C	S	c	s	â	ô	ú	␣	␣	␣	Π	≤	
		3	19	35	51	67	83	99	115	131	147	163	179	195	211	227	243	
4	0100	♦	DC4	\$	4	D	T	d	t	ä	ö	ñ	␣	␣	␣	Σ	∫	
		4	20	36	52	68	84	100	116	132	148	164	180	196	212	228	244	
5	0101	♣	§	%	5	E	U	e	u	à	ò	Ñ	␣	␣	␣	σ	J	
		5	21	37	53	69	85	101	117	133	149	165	181	197	213	229	245	
6	0110	♠		&	6	F	V	f	v	â	û	ä	␣	␣	␣	μ	÷	
		6	22	38	54	70	86	102	118	134	150	166	182	198	214	230	246	
7	0111	BEL		'	7	G	W	g	w	ç	ù	ö	␣	␣	␣	τ	≈	
		7	23	39	55	71	87	103	119	135	151	167	183	199	215	231	247	
8	1000	BS	CAN	(	8	H	X	h	x	ê	ÿ	ı	␣	␣	␣	♀	°	
		8	24	40	56	72	88	104	120	136	152	168	184	200	216	232	248	
9	1001	HT	EM	)	9	I	Y	i	y	ë	Ö	␣	␣	␣	␣	θ	■	
		9	25	41	57	73	89	105	121	137	153	169	185	201	217	233	249	
A	1010	LF		*	:	J	Z	j	z	è	Ü	␣	␣	␣	␣	Ω	—	
		10	26	42	58	74	90	106	122	138	154	170	186	202	218	234	250	
B	1011	VT	ESC	+	;	K	[	k	{	ï	Ç	½	␣	␣	␣	δ	√	
		11	27	43	59	75	91	107	123	139	155	171	187	203	219	235	251	
C	1100	FF		,	<	L	\	l		î	£	¼	␣	␣	␣	∞	ⁿ	
		12	28	44	60	76	92	108	124	140	156	172	188	204	220	236	252	
D	1101	CR	GS	—	=	M	]	m	}	ì	¥	ı	␣	␣	␣	∅	²	
		13	29	45	61	77	93	109	125	141	157	173	189	205	221	237	253	
E	1110	SO		.	>	N	^	n	~	Ä	Pt	«	␣	␣	␣	ε	■	
		14	30	46	62	78	94	110	126	142	158	174	190	206	222	238	254	
F	1111	SI		/	?	O	_	o		Å	f	»	␣	␣	␣	∩	SP	
		15	31	47	63	79	95	111	127	143	159	175	191	207	223	239	255	

## Graphic Elements

**Note:** When U.S.A. font is selected.

## Graphic Elements

[illegible]



## DOT-COLUMN WIDTH OF PROPORTIONAL CHARACTERS

This table lists the dot-column widths of Draft and NLQ proportional characters.

decimal	hex	character	dot-column width		decimal	hex	character	dot-column width	
			Draft	NLQ				Draft	NLQ
0	00	à	11	22	32	20	SP	12	24
1	01	è	11	21	33	21	!	9	17
2	02	ù	11	23	34	22	"	9	17
3	03	ò	11	22	35	23	#	12	23
4	04	ì	9	20	36	24	\$	12	21
5	05	°	9	19	37	25	%	12	23
6	06	£	11	21	38	26	&	12	23
7	07	ı	9	13	39	27	'	8	18
8	08	ı	10	21	40	28	(	8	19
9	09	Ñ	11	24	41	29	)	8	17
10	0A	ñ	11	23	42	2A	*	12	22
11	0B	œ	11	23	43	2B	+	12	22
12	0C	Pt	11	24	44	2C	,	7	13
13	0D	Å	11	23	45	2D	—	12	21
14	0E	å	11	22	46	2E	.	6	15
15	0F	ç	9	22	47	2F	/	10	23
16	10	§	11	21	48	30	0	12	21
17	11	ß	11	21	49	31	1	9	20
18	12	Æ	11	24	50	32	2	12	21
19	13	æ	11	24	51	33	3	12	21
20	14	Ø	11	23	52	34	4	12	21
21	15	ø	11	19	53	35	5	12	21
22	16	ˆ	9	20	54	36	6	12	21
23	17	Ä	11	23	55	37	7	12	21
24	18	Ö	11	23	56	38	8	12	21
25	19	Ü	11	23	57	39	9	12	21
26	1A	ä	11	22	58	3A	:	7	15
27	1B	ö	11	22	59	3B	;	7	15
28	1C	ü	11	23	60	3C	<	10	19
29	1D	É	11	23	61	3D	=	12	21
30	1E	é	11	21	62	3E	>	10	19
31	1F	¥	11	23	63	3F	?	11	21

# APPENDIX E CHARACTER SET TABLE

decimal	hex	character	dot-column width		decimal	hex	character	dot-column width	
			Draft	NLQ				Draft	NLQ
64	40	@	12	22	96	60	`	8	17
65	41	A	12	23	97	61	a	11	22
66	42	B	12	23	98	62	b	11	23
67	43	C	12	23	99	63	c	9	22
68	44	D	12	23	100	64	d	11	23
69	45	E	12	23	101	65	e	11	21
70	46	F	12	23	102	66	f	9	21
71	47	G	12	23	103	67	g	11	23
72	48	H	12	23	104	68	h	11	23
73	49	I	9	19	105	69	i	9	20
74	4A	J	12	21	106	6A	j	8	20
75	4B	K	12	23	107	6B	k	9	23
76	4C	L	12	22	108	6C	l	9	20
77	4D	M	12	24	109	6D	m	11	24
78	4E	N	12	24	110	6E	n	11	23
79	4F	O	12	23	111	6F	o	11	22
80	50	P	12	22	112	70	p	11	23
81	51	Q	12	23	113	71	q	11	23
82	52	R	12	23	114	72	r	10	22
83	53	S	12	23	115	73	s	11	23
84	54	T	12	23	116	74	t	11	21
85	55	U	12	23	117	75	u	11	23
86	56	V	12	23	118	76	v	11	23
87	57	W	12	24	119	77	w	11	24
88	58	X	10	23	120	78	x	11	23
89	59	Y	12	23	121	79	y	11	23
90	5A	Z	12	22	122	7A	z	11	21
91	5B	[	9	17	123	7B	{	9	21
92	5C	\	10	23	124	7C	:	8	17
93	5D	]	9	13	125	7D	}	9	20
94	5E	^	9	19	126	7E	~	11	21
95	5F	-	11	24	127	7F	Ø	11	21

decimal	hex	character	dot-column width		decimal	hex	character	dot-column width	
			Draft	NLQ				Draft	NLQ
128	80	â	11	22	160	A0	δ	11	21
129	81	Ç	12	23	161	A1	∞	11	23
130	82	ê	11	21	162	A2	€	10	18
131	83	ë	11	21	163	A3	∩	10	19
132	84	ï	9	21	164	A4	≡	11	24
133	85	î	9	20	165	A5	±	11	24
134	86	ô	11	22	166	A6	≥	10	24
135	87	û	11	23	167	A7	≤	10	24
136	88	ÿ	11	23	168	A8	÷	11	23
137	89	Ç	10	21	169	A9	≈	11	24
138	8A	f	10	21	170	AA	°	9	19
139	8B	á	11	22	171	AB	■	9	13
140	8C	í	9	20	172	AC	—	9	13
141	8D	ó	11	22	173	AD	√	11	24
142	8E	ú	11	23	174	AE	"	9	18
143	8F	a	11	23	175	AF	²	8	15
144	90	o	11	23	176	B0	■	9	17
145	91	½	11	23	177	B1	♥	11	24
146	92	¼	11	23	178	B2	♦	11	24
147	93	«	11	22	179	B3	♣	11	24
148	94	»	11	22	180	B4	♠	11	24
149	95	α	11	24	181	B5	§	11	21
150	96	β	11	21	182	B6	┐	11	24
151	97	Γ	10	19	183	B7	└	11	24
152	98	π	11	23					
153	99	Σ	10	17					
154	9A	σ	11	20					
155	9B	μ	12	23					
156	9C	τ	11	19					
157	9D	ϕ	10	23					
158	9E	θ	11	19					
159	9F	Ω	11	23					

**Note:** Graphic elements (B0~DF, F4, and F5) Hex in the IBM characters sets (pages 161 and 162) cannot be printed proportionally. Their dot-column widths while in Draft or NLQ print mode are 12 and 24 respectively.

## — APPENDIX F CONTROL CODE SUMMARY —

○: Valid    ×: Invalid

CATEGORY	ITEM	SYMBOL	HEX (DECIMAL)	FUNCTION	STANDARD MODE	IBM MODE	PAGE
PRINT COMMANDS	1	CR	0D (13)	Carriage return or carriage return plus linefeed after printing	○	○	56
	2	LF	0A (10)	Linefeed plus carriage return after printing	○	○	57
	3	FF	0C (12)	Form feed after printing	○	○	58
	4	VT	0B (11)	Linefeed to next vertical tab after printing	○	○	59
	5	ESC, J, n	1B, 4A, n (27, 74, n)	n/144" or n/216" linefeed after printing	○	○	60
	6	ESC, j, n	1B, 6A, n (27, 106, n)	n/144" or n/216" reverse linefeed after printing	○	○	61
CHARACTER MODE DESIGNA- TIONS	7	ESC, P	1B, 50 (27, 80)	Termination of Elite	○	○	64
	8	ESC, M	1B, 4D (27, 77)	Elite (12 CPI)	○	○	64
	9	SI	0F (15)	Condensed	○	○	65
	10	ESC, SI	1B, 0F (27, 15)	Ditto	○	○	65
	11	DC2	12 (18)	Termination of condensed	○	○	65
	12	ESC, x, 1	1B, 78, 31 (27, 120, 49)	Near Letter Quality (NLQ)	○	○	66
	13	ESC, x, 0	1B, 78, 30 (27, 120, 48)	Termination of NLQ	○	○	67
	14	ESC, p, 1	1B, 70, 31 (27, 112, 49)	Proportional	○	○	68
	15	ESC, p, 0	1B, 70, 30 (27, 112, 48)	Termination of proportional	○	○	69
	16	ESC, S, 0	1B, 53, 30, (27, 83, 48)	Superscript	○	○	69
	17	ESC, S, 1	1B, 53, 31 (27, 83, 49)	Subscript	○	○	69
	18	ESC, T	1B, 54 (27, 84)	Termination of superscript/ subscript	○	○	70
	19	ESC, 4	1B, 34 (27, 52)	Italic	○	×	70
	20	ESC, 5	1B, 35 (27, 53)	Termination of italic	○	×	71
EMPHASIZED CHARACTER	22	ESC, E	1B, 45 (27, 69)	Emphasized (bold)	○	○	73
	23	ESC, F	1B, 46 (27, 70)	Termination of emphasized	○	○	73
DOUBLE- STRIKE CHARACTER	24	ESC, G	1B, 47 (27, 71)	Double-strike	○	○	74
	25	ESC, H	1B, 48 (27, 72)	Termination of double-strike	○	○	75
DOUBLE- WIDTH CHARACTER	26	SO	0E (14)	Double-width mode valid for only the present line	○	○	75
	27	ESC, SO	1B, 0E (27, 14)	Ditto	○	○	75
	28	DC4	14 (20)	Termination of <span style="border: 1px solid black;">SO</span> command	○	○	75
	29	ESC, W, 1	1B, 57, 31 (27, 87, 49)	Double-width mode valid until terminated	○	○	76
	30	ESC, W, 0	1B, 57, 30 (27, 87, 40)	Termination of <span style="border: 1px solid black;">ESC W 1</span> command	○	○	76

# APPENDIX E CHARACTER SET TABLE

○: Valid ×: Invalid

CATEGORY	ITEM	SYMBOL	HEX (DECIMAL)	FUNCTION	STANDARD MODE	IBM MODE	PAGE
GRAPHIC MODE	31	ESC, K, n <sub>1</sub> , n <sub>2</sub>	1B, 4B, n <sub>1</sub> , n <sub>2</sub> (27, 75, n <sub>1</sub> , n <sub>2</sub> )	Standard-density graphic mode	○	○	76
	32	ESC, L, n <sub>1</sub> , n <sub>2</sub>	1B, 4C, n <sub>1</sub> , n <sub>2</sub> (27, 76, n <sub>1</sub> , n <sub>2</sub> )	Double-density graphic mode	○	○	78
	33	ESC, Y, n <sub>1</sub> , n <sub>2</sub>	1B, 59, n <sub>1</sub> , n <sub>2</sub> (27, 89, n <sub>1</sub> , n <sub>2</sub> )	Double-speed double-density graphic mode	○	○	79
	34	ESC, Z, n <sub>1</sub> , n <sub>2</sub>	1B, 5A, n <sub>1</sub> , n <sub>2</sub> (27, 90, n <sub>1</sub> , n <sub>2</sub> )	Quadruple-density graphic mode	○	○	80
	35	ESC, *, m, n <sub>1</sub> , n <sub>2</sub>	1B, 2A, m, n <sub>1</sub> , n <sub>2</sub> (27, 42, m, n <sub>1</sub> , n <sub>2</sub> )	Various graphic modes designation	○	○	81
	36	ESC, ^, a, n <sub>1</sub> , n <sub>2</sub>	1B, 5E, a, n <sub>1</sub> , n <sub>2</sub> (27, 94, a, n <sub>1</sub> , n <sub>2</sub> )	9-pin graphic designation	○	○	82
	37	ESC, ?, n, m	1B, 3F, n, m (27, 63, n, m)	Re-assign 8-bit graphic modes	○	○	83
LINEFEED PITCH	38	ESC, 0	1B, 30 (27, 48)	Set linefeed pitch to 1/8"	○	○	84
	39	ESC, 1	1B, 31 (27, 49)	Set linefeed pitch to 7/72"	○	○	84
	40	ESC, 2	1B, 32 (27, 50)	Set linefeed pitch to 1/6"	○	—	85
				Perform <b>[ESC] A</b> command	—	○	85
	41	ESC, 3, n	1B, 33, n (27, 51, n)	Set linefeed pitch to n/216" or n/144"	○	○	86
	42	ESC, A, n	1B, 41, n (27, 65, n)	Set linefeed pitch to n/72"	○	—	87
				Set linefeed pitch of n/72" that will become valid by <b>[ESC] 2</b> command.	—	○	87
	43	GS, (01)	1D, 01 (29, 1)	Designate linefeed pitch of n/144" for <b>[ESC] 3n</b> , <b>[ESC] Jn</b> , and <b>[ESC] jn</b> commands	○	○	88
	44	GS, (00)	1D, 00 (29, 0)	Designate linefeed pitch of n/216" for <b>[ESC] 3n</b> , <b>[ESC] Jn</b> , and <b>[ESC] jn</b> commands	○	○	88
PAGE LENGTH	45	ESC, C, n	1B, 43, n (27, 67, n)	Line unit page length setting	○	○	89
	46	ESC, C, (00), n	1B, 43, 00, n (27, 67, 0, n)	Inch unit page length setting	○	○	90
HORIZONTAL TAB	47	ESC, D, ..., NUL	1B, 44, ..., 00 (27, 68, ..., 0)	Horizontal tab position setting	○	○	91
	48	HT	09 (9)	Move to next horizontal tab	○	○	92
MARGIN SETTING	49	ESC, O, n	1B, 51, n (27, 81, n)	Right margin setting	○	○	92
	50	ESC, ℓ, n	1B, 6C, n (27, 108, n)	Left margin setting	○	○	93
	51	ESC, X, n <sub>1</sub> , n <sub>2</sub>	1B, 58, n <sub>1</sub> , n <sub>2</sub> (27, 88, n <sub>1</sub> , n <sub>2</sub> )	Left and right margins setting	○	○	94
UNDER-LINING	52	ESC, -, 1	1B, 2D, 31 (27, 45, 49)	Underline setting	○	○	95
	53	ESC, -, 0	1B, 2D, 30 (27, 45, 48)	Underline termination	○	○	95
BUFFER CLEAR	54	CAN	18 (24)	Clear internal buffer	○	○	95

# APPENDIX F CONTROL CODE SUMMARY

○: Valid    ×: Invalid

CATEGORY	ITEM	SYMBOL	HEX (DECIMAL)	FUNCTION	STANDARD MODE	IBM MODE	PAGE
BACK SPACE	55	BS	08 (8)	After printing, move 1 character position to the left.	○	○	96
BUZZER	56	BEL	07 (7)	Sound buzzer	○	○	96
HOME POSITIONING	57	ESC, <	1B, 3C (27, 60)	Move print head to home position	○	○	97
SKIP-OVER PERFORATION	58	ESC, N, n	1B, 4E, n (27, 78, n)	Skip over n bottom line of the page	○	○	97
	59	ESC, O	1B, 4F (27, 79)	Termination of skip-over perforation	○	○	97
PAPER-OUT DETECTION	60	ESC, 8	1B, 38 (27, 56)	Disable paper-out detection	○	○	99
	61	ESC, 9	1B, 39 (27, 57)	Enable paper-out detection	○	○	99
RESET	62	ESC, @	1B, 40 (27, 64)	Initialize printer	○	○	99
PRINTING DIRECTION	63	ESC, U, 1	1B, 55, 31 (27, 85, 49)	Unidirectional printing designation	○	○	99
	64	ESC, U, 0	1B, 55, 30 (27, 85, 48)	Bidirectional printing designation	○	○	100
INTER-NATIONAL CHARACTERS	65	ESC, R, n	1B, 52, n (27, 82, n)	Select international character	○	—	100
TAB INITIALI-ZATION	66	ESC, R	1B, 52 (27, 82)	Restore default tab settings	—	○	102
DELETING DATA	67	DEL	7F (127)	Delete one character	○	×	102
			FF (255)				
VERTICAL TAB	68	ESC, B	1B, 42 (27, 66)	Vertical tab setting	○	○	102
	69	ESC, b	1B, 62 (27, 98)	Vertical tab setting in channels	○	×	103
	70	ESC, /, m	1B, 2F, m (27, 47, m)	Select channel of vertical tab	○	×	103
PRINTER SELECTION	71	DC3	13 (19)	De-select printer	○	○	105
	72	DC1	11 (17)	Select printer	○	○	105
DOWNLOAD CHARACTERS	73	ESC, %, 00, 00	1B, 25, 00, 00 (27, 37, 0, 0)	Select normal character set stored in ROM	○	×	106
	74	ESC, %, 01, 00	1B, 25, 01, 00 (27, 37, 1, 0)	Switch to download character set stored in RAM			106
	75	ESC, :, 00, 00, 00	1B, 3A, 00, 00, 00 (27, 58, 0, 0, 0)	Copy RAM download character set from ROM character set			106
	76	ESC, &, ...	1B, 26 (27, 38)	Define download characters			107
INPUT DATA CONTROL	77	ESC, =	1B, 3D (27, 61)	8th bit (MSB) of data is '0'	○	×	114
	78	ESC, >	1B, 3E (27, 62)	MSB of data is '1'	○	×	115
	79	ESC, #	1B, 23 (27, 35)	Recognize 8 bits of data	○	×	115



# APPENDIX F CONTROL CODE SUMMARY

○: Valid ×: Invalid

CATEGORY	ITEM	SYMBOL	HEX (DECIMAL)	FUNCTION	STANDARD MODE	IBM MODE	PAGE
PRINT CODE AREA DESIGNA- TION	80	ESC, 6	1B, 36 (27, 54)	Enlarge print codes area	○	—	116
				IBM character set 2 designation	—	○	116
	81	ESC, 7	1B, 37 (27, 55)	Clear <b>ESC</b> <b>6</b> command	○	—	117
				IBM character set 1 designation	—	○	117
	82	ESC, I, 1	1B, 49, 31 (27, 73, 49)	Define print characters in control code area	○	×	117
	83	ESC, I, 0	1B, 49, 30 (27, 73, 48)	Clear <b>ESC</b> <b>I</b> <b>1</b> command	○	×	118
IMMEDIATE PRINTING	84	ESC, i, 1	1B, 69, 31 (27, 105, 49)	Immediate printing without a print command	○	○	119
	85	ESC, i, 0	1B, 69, 30 (27, 105, 48)	Clear <b>ESC</b> <b>i</b> <b>1</b> command	○	○	119
CSF CONTROL	86	ESC, EM, 4	1B, 19, 34 (27, 25, 52)	Designate CSF mode	○	○	120
	87	ESC, EM, 0	1B, 19, 30 (27, 25, 48)	Terminate CSF mode	○	○	121
	88	ESC, EM, R	1B, 19, 52 (27, 25, 82)	Eject a cut sheet	○	○	121
CR CODE CONTROL	89	ESC, 5, 1	1B, 35, 31 (27, 53, 49)	CR command = CR + LF	×	○	121
	90	ESC, 5, 0	1B, 35, 30 (27, 53, 48)	CR command = CR only	×	○	122
PRINT POSITION CONTROL	91	ESC, SP, n	1B, 20, n (27, 32, n)	Set intercharacter space in dot units	○	○	122
	92	ESC, \$, n <sub>1</sub> , n <sub>2</sub>	1B, 24, n <sub>1</sub> , n <sub>2</sub> (27, 36, n <sub>1</sub> , n <sub>2</sub> )	Set absolute dot position	○	○	123
	93	ESC, \, n <sub>1</sub> , n <sub>2</sub>	1B, 5C, n <sub>1</sub> , n <sub>2</sub> (27, 92, n <sub>1</sub> , n <sub>2</sub> )	Set relative dot position	○	○	123

○ Valid × Invalid

CATEGORY	HEX	SYMBOL	HEX (DECIMAL)	FUNCTION	STANDARD MODE	IBM MODE	PAGE
PRINT CODE AREA DESIGNATION	80	ESC 6	1B, 30 (27, 54)	Delays print codes area	○	×	116
	81	ESC 7	1B, 31 (27, 55)	IBM character set 2 designation	○	×	116
	82	ESC 1.1	1B, 46, 31 (27, 77, 46)	Define print characters in control code area	○	×	117
	83	ESC 1.0	1B, 46, 30 (27, 77, 46)	Clear <b>ESC 1.0</b> command	○	×	118
	84	ESC 1.1	1B, 69, 31 (27, 105, 46)	Immediate printing without a print command	○	○	119
	85	ESC 1.0	1B, 69, 30 (27, 105, 46)	Clear <b>ESC 1.0</b> command	○	○	119
CSP CONTROL	86	ESC EM, 4	1B, 16, 34 (27, 25, 25)	Designate CSP mode	○	○	120
	87	ESC EM, 0	1B, 16, 30 (27, 25, 46)	Terminate CSP mode	○	○	121
	88	ESC EM, R	1B, 16, 32 (27, 25, 82)	Eject a test sheet	○	○	121
	89	ESC 2.1	1B, 35, 31 (27, 57, 46)	CR command = CR + LF	×	○	121
CR CODE CONTROL	90	ESC 2.0	1B, 35, 30 (27, 57, 46)	CR command = CR only	×	○	122
	91	ESC 2P, n	1B, 36, n (27, 57, n)	Set intercharacter space in dot units	○	○	122
PRINT POSITION CONTROL	92	ESC 3, n, n	1B, 34, n, n (27, 56, n, n)	Set absolute dot position	○	○	123
	93	ESC 4, n, n	1B, 35, n, n (27, 57, n, n)	Set relative dot position	○	○	123